# DOCUMENT RESUME

ED 111 801 95 SP 009 494

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| TITLE | Panel Summaries from the National Conference on Studies in Teaching (June 16-20, 1974, Washington, D.C.). |
| INSTITUTION | National Inst. of Education (DHEW), Washington, D.C. |
| PUB DATE | Dec 74 |
| NOTE | 141p.; For related documents, see SP 009 495-504 |
| EDRS PRICE | MF-$0.76 HC-$6.97 Plus Postage |
| DESCRIPTORS | *Educational Objectives; *Educational Theories; *Instructional Innovation; *Research Methodology; Teacher Behavior; *Teacher Education; *Teacher Recruitment; *Teaching Skills |

ABSTRACT

This volume consists of abridged reports of the 10 panels that participated in a five-day conference in Washington during the summer of 1974. The primary objective of the conferenc was to provide an agenda for further research and development to guide the National Institute of Education in its planning and funding over the next several years. Both by the involvement of some 100 practitioners, administrators, and researchers as panelists, and by the public debate and criticism of the panel reports, the institute aims to create a major role for the practitioner and research communities in determining the direction of government funding. The conference panels were organized around the following major points in the career of a teacher: (1) the teacher's recruitment, selection, and retention (Panel 1); (2) training and performance, as approached from various perspectives (Panels 2-6); and (3) instructional personnel utilization (Panel 7). In addition, several special problem areas for planning and research were covered by another three panels. These were the role of the teacher in new instructional systems (Panel 8), research methodology (Panel 9), and theory development (Panel 10). Within its specific problem area, each panel refined its goal statement, outlined several approaches or overall strategies, identified potential programs within each approach, and outlined illustrative projects so far as this was appropriate and feasible. (Author/BD)

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# panel summaries

from the

# national conference on studies in teaching

SP 009 494

national institute of education

Summary reports of the National Planning Conference on Studies in Teaching, held June 16-20, 1974, at Dulles International Airport; organized and chaired by Dr. N.L. Gage under the sponsorship of the National Institute of Education, U.S. Department of Health, Education and Welfare.

Washington, D.C.
December, 1974

Abridged from the respective panel-authored reports by staff of the Program on Teaching and Curriculum, Office of Research, NIE, as coordinated by Virginia Koehler and Kent Viehoever.

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For complete listing of Conference coordinators and participants, see inside back flyleaf.

# PREFACE

This volume consists of abridged reports of the ten panels that participated in a five-day conference in Washington during the summer of 1974. The primary objective of this Conference was to provide an agenda for further research and development to guide the Institute in its planning and funding over the next several years. Both by the involvement of some 100 respected practitioners, administrators, and researchers as panelists, and by the public debate and criticism of the panel reports, the Institute aims to create a major role for the practitioner and research communities in determining the direction of government funding.

The Conference itself is seen as only an event in the middle of the process. In many months of preparation for the Conference, the staff met with a number of groups--students, teachers, administrators, etc.--to develop coherent problem statements which served as a charge to the panelists. Panel chairmen and others met both before and after the Conference. Several other panelists were commissioned to pull together the major themes and recommendations that kept recurring in different panels (being reported in a separate Conference Summary Report). Reports are being distributed to practitioner and research communities. The Institute encourages other interest groups to debate and critique relevant panel reports from their own perspectives.

The Conference rationale stems from the frank acknowledgment that much of the funding for educational research and development projects has not been coordinated and sequenced in such a way as to avoid undue duplication yet fill significant gaps, or in such a way as to build a cumulative impact relevant to educational practice. Nor have an agency's affected constituencies ordinarily had the opportunity for public discussion of funding alternatives and proposed directions prior to the actual allocation of funds. The Conference is thus seen as the first major Federal effort to develop a coordinated research effort in the social sciences, the only comparable efforts being the National Cancer Plan and the National Heart and Lung Institute Plan, which served as models for the present Conference.

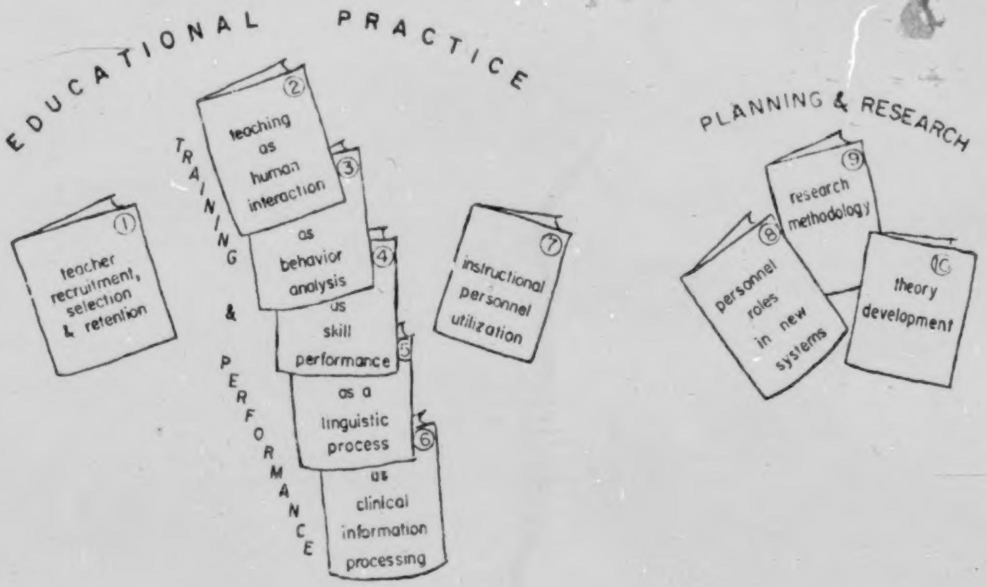
As one of the Conference panels points out, education in the United States is moving toward change, whether we do anything about it or not. The outcomes of sound research and development--though only a minute portion of the education dollar--provide the leverage by which such change can be afforded coherent direction.

In implementing these notions for the area of teaching, Conference panels were organized around the major points in the career of a teacher:

- the teacher's recruitment, selection, and retention (Panel 1);
- training and performance, as approached from various perspectives (Panels 2 through 6); and
- utilization (Panel 7).

In addition, several special problem areas for planning and research were covered by three further panels:

- the role of the teacher in new instructional systems (Panel 8);
- research methodology (Panel 9); and
- theory development (Panel 10).


EDUCATIONAL PRACTICE
TRAINING & PERFORMANCE
① teacher recruitment, selection & retention
② teaching as human interaction
③ as behavior analysis
④ as skill performance
⑤ as a linguistic process
⑥ as clinical information processing
⑦ instructional personnel utilization
PLANNING & RESEARCH
⑨ research methodology
⑧ personnel roles in new systems
⑩ theory development

Within its specific problem area, each panel refined its goal statement, outlined several "approaches" or overall strategies, identified potential "programs" within each approach, and sketched out illustrative projects so far as this was appropriate and feasible.

Since the brunt of this work was done in concentrated sessions in the space of a few days, the resulting documents are not polished, internally consistent, or exhaustive. They are working papers, and their publication is intended to stimulate debate and suggestions for refinement by serious readers. The abridged versions included together here exhibit a similar lack of polish and reflect a similar intent. Queries and comments, or requests for individual panel reports, should be directed to:

Garry L. McDaniels, Assistant Director
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# panel summaries

DRAFT

NATIONAL INSTITUTE OF EDUCATION
OFFICE OF RESEARCH
PROGRAM ON TEACHING AND CURRICULUM

# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 1 SUMMARY

## RECRUITMENT, SELECTION, AND RETENTION

### GOAL STATEMENT

Panel one's Goal was:

To recommend research that will identify the factors affecting recruitment, selection, and retention of teachers and the means of improving these processes; and

To plan exemplary research and development activities for devising, validating, and installing methods for improving individuals' and institutions' decisions at critical points in a teacher's career.

### PARTICIPANTS

Dr. James Deneen, Chairperson
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Mr. William Demmert
Dr. Goldine Gleser
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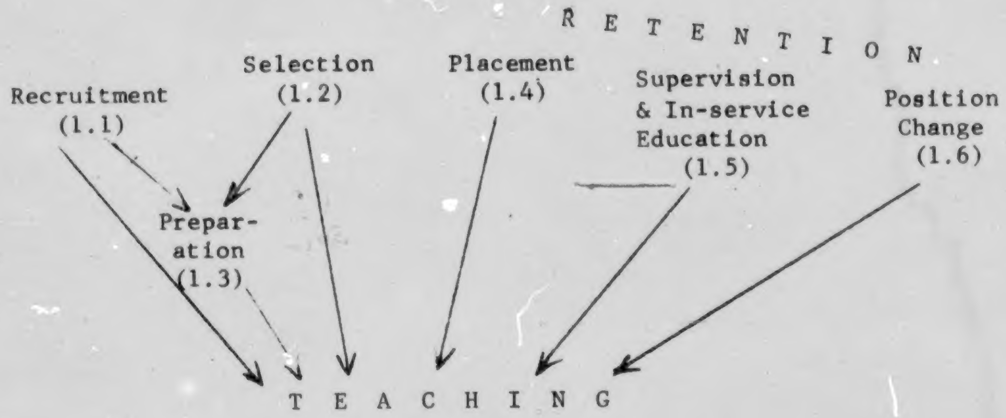
R E T E N T I O N
Recruitment (1.1)
Selection (1.2)
Placement (1.4)
Supervision & In-service Education (1.5)
Position Change (1.6)
Preparation (1.3)
T E A C H I N G

## SUMMARY

The Panel on Recruitment, Selection and Retention of Teachers organized the research Approaches under the functional nature of six events in a teacher's career. These Approaches reflect a concern with the nature of the processes that determine who does or who does not become or remain a teacher. These approaches are concerned with:

1. Recruitment (into teacher training and teaching itself).
2. Selection (into both training and teaching).
3. Preparation (for teaching).
4. Placement and orientation in a teaching position.
5. Supervision and in-service education.
6. Position changes.

## DISCUSSION

For some thirty years prior to 1970, school districts recruited and selected teachers in a seller's market. Recruitment and selection measures focused on two areas: the candidate's availability and his or her possession of appropriate certification. Even the latter criterion frequently had to be waived if classrooms were to be staffed.

Today, the market for teachers is radically different. At least a quarter of a million certified teachers are seeking full-time employment. Because graduating classes of teacher education institutions still total around 200,000 yearly, the supply of teachers continues to expand dramatically.

Given this surplus, teacher educators and employers can now be more selective in admitting teacher trainees and teachers into training opportunities and employment. Thus, research recruitment, selection, and retention must address two fundamental questions: How can we identify the best teachers and the best potential teachers? How can we retain the best teachers and teacher trainees?

The research problem raised in the first question is essentially that of determining the criteria against which recruitment, selection, and retention decisions can be made in a valid manner. These issues call for attention to the problems of defining variables and improving the validity of predictors. They also require research aimed at improving the decision-making processes and methods related to the functions of recruitment, selection, and retention. For example, how can a recruitment program be structured to yield an optimally useful faculty for a school or school system?

The classic research and development pattern in teacher recruitment, selection, and retention consists in identifying criteria, selecting potential predictors of those criteria, and empirically determining their predictive validity. The Panel, accordingly, gave early attention to criteria, predictors, and ways of basing judgments on their relationships.

The Panel recognized that the functions of recruitment, selection, and retention occurred at various stages in a teacher's career. For example, recruitment can be considered as a process occurring at the college level (attracting undergraduates into teacher training) or at the district level (attracting teachers to employment). The Panel, therefore, discussed the processes of recruitment, selection, and retention on a functional level rather than specifically relating them to any one stage of the teaching career.

In order to incorporate aspects which could not be adequately represented by the Panel membership, the Panel enlisted two advisory groups. The first advisory group included representatives from the American Federation of Teachers, the National Education Association and the American Association of Colleges for Teacher Education. This group presented ideas on the involvement of teachers in planning, conducting and evaluating research and in-service teacher education. The advisors also dealt with aspects of the sociology of teaching, internships for teaching, the improvement of manpower projections, leadership training, and multi-cultural development.

The second advisory group consisted of a staff psychologist from the Equal Employment Opportunity Commission (EEOC) and a lawyer who frequently represents the National Education Association in teacher selection and retention lawsuits. These advisors spoke of models for validating selection procedures and the impact of court decisions and EEOC requirements on the validation of selection measures.

The first problem faced by the Panel was the danger of being paralyzed by the criterion problem. If recruitment, selection, and retention decisions are to be examined, against what standard are they to be judged? What constitutes "good," "competent," or "effective" teaching was, however, a question with which other panels at the Conference, especially Panels 2-6, were to be concerned. Therefore, the Panel indicated its concern for intensified research on the basic criterion issues, then moved on to consider research on the processes involved in recruiting, selecting, and retaining (or not retaining) teachers.

The Panel did note, however, that efforts to define the criteria of teacher effectiveness in terms of student achievement or attitude go beyond present legal requirements for selection and in-service evaluation procedures, and may not be necessary at the present time for school district purposes. The newly-reissued American Psychological Association's *Guidelines for the Evaluation of Standardized Tests*, the long-awaited *Uniform Guidelines on Employee Selection Procedures* for federal agencies, and recent federal court decisions all express a willingness to settle for content validation, i.e., validation based on formal job descriptions and job analyses.

The decision to avoid seeking that solution of the problem which says that "teaching competence must equal demonstrated ability to cause desirable learning in students" was based on a reality repeatedly recognized by the practitioner-members of the Panel: decisions concerning recruitment, selection and retention are being made daily in colleges and school systems, often on the basis of highly subjective procedures. Anything that can help to regularize and rationalize those procedures will be a step forward for most school district personnel offices. With improved procedures for on-the-job practices based on formal job analyses, school districts can wait with relative calm for the eventual possibility of defining teacher effectiveness in terms of student gain.

The Panel also attempted to relate the recruitment, selection, and retention processes to one another. In many school districts and teacher institutions, the inservice or in-training standards are not systematically linked to the selection and recruitment processes. Similarly, selection and evaluation are frequently not the main source of information for designing individualized teacher supervision and inservice education programs. To emphasize dependency relationships in the total teacher recruitment-selection-retention process, the Panel sought to relate the approaches to both teacher training and the practice of teaching. Nevertheless, teacher training was given less consideration in view of the concentration on that subject by other panels.

Much of the Panel's discussion centered on the role of research in determining the values and priorities which school systems place on possible educational outcomes. For example, some school systems may value the maintenance of discipline over an open, "caring" environment in the classroom. These values may vary widely from one system to another. One way of determining these values might be to look at the types of outcomes that are rewarded by the school system. Such an investigation might proceed by describing the teaching styles and classroom behaviors of those teachers who are considered to be the "best" in that system.

It is likely that shared values regarding educational goals on the part of the potential teacher and the school system will go a long way toward solving the problem of teacher retention. This possibility is researchable, as is the question of the degree to which value systems differ among school systems.

If school systems differ substantially in their educational goals, research might address the problem of whether different criteria for teacher selection are needed. Thus, will persons with certain aptitudes and characteristics do well as teachers regardless of the type of school system that hires them? Or do the characteristics of the effective teacher depend on the type of system? If different teacher characteristics are required in different school systems, are the characteristics produced by the education the prospective teacher receives, or do they stem from earlier pre-teaching experience?

The Panel also discussed the effect of the job market on recruitment and selection. When the number of vacancies is far less than the number of potential applicants, as is true in 1974, selection at some level is inevitable. The selection may occur at admission to college, at admission to the teacher education program, or at the point of hiring for a teaching position. Research could be directed at determining the best time for selection from the standpoint of the educational system as a whole, from the standpoint of the colleges, and from that of potential teachers. Another researchable question is whether sequential selection procedures should be used with liberal quotas for college admission. Panel members commented that since the potential teacher often cannot have much choice as to the specific position in which he or she will teach, what must be considered is the problem of selecting or training persons for maximum adaptability and growth potential.

## Approach 1.1: Analyze and Improve Methods for Recruiting Teachers and Teacher Trainees

New trends and pressures impinging on the teaching profession indicate that the recruitment process needs to be examined. Recent studies indicate that there are at least two candidates for every teaching position. Further, teachers and other personnel are now being utilized in schools in more diverse ways. These changing styles of personnel utilization include the use of para-professionals, a variety of student-teaching models, involvement of the local community in the learning process, and the development of team teaching.

Yet the concepts upon which teacher and teacher-trainee recruitment are based are outgrowths of traditional styles of teacher preparation and personnel utilization. Morever, information regarding candidates and opportunities has typically been institution-based, that is, based upon exchanges between school district personnel offices and teacher training institutions.

As a result, the persons selected and admitted into the profession have been a relatively limited and homogeneous group. Their homogeneity may be partially attributable to restrictive recruitment practices and to individual's career decisions regarding teaching. At present, however, we not have information indicating the reasons for the selection or rejection of teaching as a vocation by different types of individuals.

The programs developed within Approach 1.1 focus on the recruitment process in both its quatitative and qualitative aspects. Given the general oversupply of teachers, the Panel was not concerned with attracting more teachers of all types into the profession. Rather it was concerned with identifying what skills might be in short supply (or greater demand) and with matching teachers and teaching environments.

## Approach 1.2.: Analyze and Improve Methods for Selecting Teacher Traniees and Teachers

Selecting entrants into teacher education or into teaching jobs is now only occassionally a rational process; more often it is nonsystematic or haphazard. A considerable body of theory and technology could make selection a more valid, objective, and efficient process in mapping such a process. Concepts and procedures have been drawn from developments in business, in psychological research, in educational research, and in educational practice.

Increasingly useful and sound methods have been developed for identifying the teaching-relevant characteristics of individuals. Significant analyses could now be made of the critical demands of particular teaching positions, considering specific kinds of schools, subjects, and pupils. Progress has been made toward statistical models that can test the "goodness of fit" of an individual with a specific job. Perhaps of equal importance, some procedures have been developed for personalizing the entire system, making the teacher an active partner in the whole process of exploring and deciding what he or she can do best and wants to do.

In practice, these potentially powerful resources have almost nowhere been synthesized and used in a coherent, systematic way. The rational matching of teacher capabilities with the demands of particular teaching jobs cannot reasonably be proposed until certain kinds of basic and developmental research have been carried out. Tools need to be invented or adapted to measure both teacher characteristics and job demands. Research emphasis must be placed at this time on identifying situational factors that affect teacher effectiveness, and on devising improved procedures for selection in the specific situation rather than searching for a universally appropriate type.

### Approach 1.3.: Investigate the Relationship of Teacher Preparation Objectives and Curriculum to Teacher Competency and Effectiveness.

Early studies of teacher education took the form of surveys of current programs. These surveys described the then current status and helped to identify problems and trends. Subsequently, the American Council on Education attempted to encourage selected institutions to develop new kinds or programs and analyze their impact. Several publications appeared as a result of these studies, including one on the use of evaluation in teacher education. By the late 1950's, there was so much diversity in teacher education programs that efforts were begun to standardize requirements through national accreditation, such as the efforts by NEA's National Commission on Teacher Education and Professional Standards in 1959 and 1960.

In contrast to this movement toward uniformity, several promising alternative approaches have been developed. Among these are the tutorial and clinical program at Northwestern University, the University of Wisconsin intern in teaching program, the Cardoza project in urban teaching, the Stanford University teacher intern program, the experimental teacher education program at Wayne State University, and the personalized teacher education program developed by the Texas R&D Center and used in whole or in part in a number of teacher education institutions in the United States and abroad. Another recent development is the trend toward competency-based teacher education.

Empirical studies of teacher education require an extremely complex, multifaceted research operation that is inherently expensive. Fairly comprehensive evaluation studies of program effects have been possible only at a few places, such as the Stanford and Texas R&D Centers. More such research programs are needed, if the best features (and the worst flaws) of the several teacher education models are to be identified. Only sound evaluation studies, tracking important program effects into the subsequent performance of teachers, will make it possible to prescribe teacher education procedures that have a high probility of working well.

Every major kind of preparation program for teachers should be subjected to a rigorous, objective examination of its effects. Furthermore, each significant sub-component should be empirically tested to determine whether it does what it is supposed to do. The National Council for the Accreditation of Teacher Education has been calling for this practice for the last three years. Little money has been assigned to this function, however, and a source of revenue for local funding simply is not in sight. The fact that training is funded through colleges, while professional performance is paid for by local school systems, makes this kind of empirical work a problem that cuts across institutional lines, since neither colleges nor school systems have funds for such research. Only large-scale, federal funding will make it possible to build genuine quality control into the education of teachers, both pre-service and in-service.

## Approach 1.4 : Analyze and Improve Methods for Teacher Placement and Orientation

The practices associated with induction into teaching positions have long been stabilized at an inadequate level. Often, the newly certified teacher moves from the role of student to that of classroom teacher with a relatively brief student teaching experience and a cursory welcome and offer of assistance from the supervisor. Beginning teachers are one of a host of groups competing for the time of principals and superintendents as a school year begins.

Some districts extend the welcoming day to "orientation week," assign to each novice a "helping teacher" and allow the beginner some free time for visiting the classrooms of older and presumably wiser colleagues. The faculty room coffee break and lunch hour frequently are the most potent orientation influences--though not always positive ones. A few districts with provision for multi-level staff roles or formal internship programs offer a more appealing and presumably more effective introduction to teaching.

These practices cannot now be alleviated by appealing for implementation of demonstrably better approaches since little research exists on the impact of teacher placement and orientation procedures on teacher satisfaction, teacher retention rates, or student growth. The literature on the subject consists of several varieties of personal experiences and opinions: Teachers write extremely unfavorable accounts of their first-year experiences. Administrators complain that teachers trained at almost any university are ineffective in the inner city schools; they agree that the teacher training institutions have failed to prepare their graduates for the real world.

Research in the area of teacher placement and pre-service orientation could be expected to yield information on the costs and benefits to school districts of higher teacher retention rates that might result from better assignment and pre service training. Would such improved procedures result in fewer complaints or formal grievances and reduced incidence of teacher illness? Would children learn more form teachers who have been carefully placed by school administrators in a mutually agreeable situation and offered a gradual, professionally-supervised induction into full teaching duties? Would more extensive and better planned assistance for beginning teachers result in less acceptance of stereotypes about instructional methods and student characteristics? In better relationships with administrators and parents? Would teachers so assisted be more open to change and innovation in their classroom procedures?

## Approach 1.5 : Analyze and Improve the Supervision and Inservice Education of Teachers.

The area of teacher recruitment, selection, and retention is vitally concerned with proper staff assignment and reassignment as a major component of any educational program of high quality. Ideally, assignments relate directly to staff needs and are influenced by such critical factors as the training characteristics, background, or talents of personnel. Actually, however, assignments are too often made in a way which merely fills a current need or vacancy and may result in an individual's not being fitted to a particular situation.

Interest in and concern for proper staff assignment goes beyond initial placement. Likewise, interaction between personnel and supervisors continues and intensifies once an assignment is made.

Evaluation procedures and processes involving reliable measurement instruments and systems should become an integral part of this interaction. Judgments that focus upon improving service within an assignment area and emphasize improving teacher performance are desirable and effective. Improving service and ensuring that personnel growth through cooperatively planned and comprehensive inservice programs. As continued growth and evidence of successful experience and effectiveness are recognized, the teachers' need for opportunities for some form of advancement or reassignment becomes apparent. Better planned assignment of personnel to postions should improve staff retention and effectiveness.

The programs developed within this Approach deal with research efforts to improve the skills, utilization, and advancement opportunities of teachers who have already entered the profession.

### Approach 1.6 : Investigate the Decision-Making Processes Underlying Position Changes in Teaching

The lack of knowledge about the social structure, social psychology, and culture of schools and teaching has resulted in a limited understanding of the reasons for which people remain in, leave, or make changes of positions within the profession. Several hypotheses have been advanced to account for teachers' changing positions. For example, these changes may be caused by profound and unperceived differences of educational goals between teachers to accept students' and parents' standards and goals that are different from theirs. Or, the lack of opportunities for promotion may induce teachers to leave for higher salaries, greater responsibilities, or higher professional status. Very few teachers (less than 10%) in public schools represent the minority groups that are educated in public schools. Relatively few potential teachers from minority cultures have an opportunity to enter the teaching profession. When the cultural background of teachers differs widely from that of their students, either students or teachers or both may leave the school.

Many teachers leave the profession for a wide variety of personal reasons, e.g., teachers' low salaries and status, the use of teaching as a "second" job supporting a family unit. Some teachers leave the profession when their efforts are frustrated by inadequate preparation. They may be unable to communicate with children, to appreciate other cultures, to understand the learning styles and problems of various types of children, or to diagnose the educational, emotional, cultural, or health problems of children. Finally, teachers may feel frustrated when they do not have an opportunity to influence decisions that affect their professional lives.

In addition to teachers' own reasons for changing positions, school systems may move teachers from position to position or out of the system; and the processes involved in these organizational decisions should also be investigated.

## LIST OF APPROACHES AND PROGRAMS

| | | |
|---|---|---|
| 1. | Analyze and Improve Methods for Recruiting Teachers and Teacher Trainees | 1.1 |
| | a. Develop Manpower Projections for Teaching | 1.1.1 |
| | b. Design Recruitment Programs | 1.1.2 |
| | c. Implement Model Recruitment Programs | 1.1.3 |
| 2. | Analyze and Improve Methods for Selecting Teacher Trainees and Teachers | 1.2 |
| | a. Determine Procedures for Specifying Educational Objectives Related to Outcomes in the Cognitive, Affective, and Coping Skills of Students | 1.2.1 |
| | b. Determine Procedures for Identifying Desirable Teacher and Trainee Behaviors | 1.2.2 |
| | c. Improve the Collection and Analysis of Qualifying (Pre-Selection) Data | 1.2.3 |
| | d. Design Efficient Procedures for Making Selection Decisions | 1.2.4 |
| 3. | Investigate the Relationship of Teacher Preparation Objectives and Curriculum to Teacher Competency and Effectiveness | 1.3 |
| | a. Investigate General Education Courses | 1.3.1 |
| | b. Investigate Professional Education Courses | 1.3.2 |
| | c. Investigate Courses in the Subject Matter Field | 1.3.3 |
| | d. Investigate Means for Improving Student Teaching | 1.3.4 |
| | e. Investigate Alternative Certification Routes | 1.3.5 |
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| | a. Design and Test New Teacher Placement Programs | 1.4.1 |
| | b. Design and Test New Teacher Orientation Programs | 1.4.2 |
| | c. Examine Organizational and Individual Decision-Making Processes in the Placement and Orientation of Teachers and Teacher Trainees | 1.4.3 |
| 5. | Analyze and Improve the Supervision and Inservice Education of Teachers | 1.5 |
| | a. Analyze and Improve Inservice Training Activities | 1.5.1 |
| | b. Synthesize and Use Current Knowledge Concerning the Evaluation Process | 1.5.2 |
| | C. Develop and Evaluate Models of Teaching as a Multi-Level Profession | 1.5.3 |

6. Investigate the Decision-Making Processes Underlying Position Changes in Teaching 1.6

   a. Investigate Personal Decisions by Teachers and Trainees Resulting in Position Changes 1.6.1

   b. Investigate Organizational Decisions Resulting in Position Changes by Teacher or Trainees 1.6.2

   c. Design and Conduct a Series of Studies on Moral Decision-Making Processes in School Organizations 1.6.3

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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 2 SUMMARY

## TEACHING AS HUMAN INTERACTION

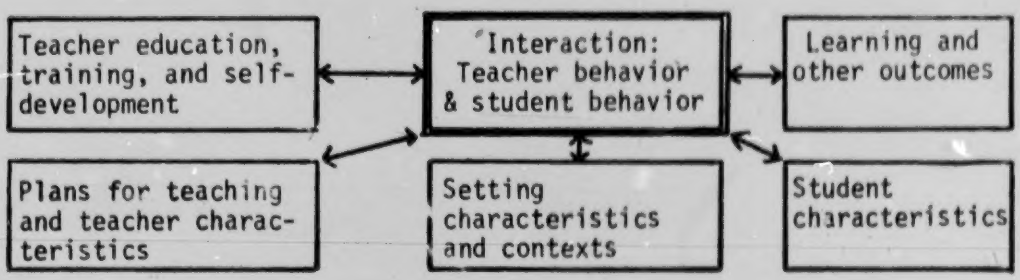
### GOAL STATEMENT

The goal of this Panel is to develop the means to improve the reliability, validity, and utility of analyses of human interaction in learning settings.

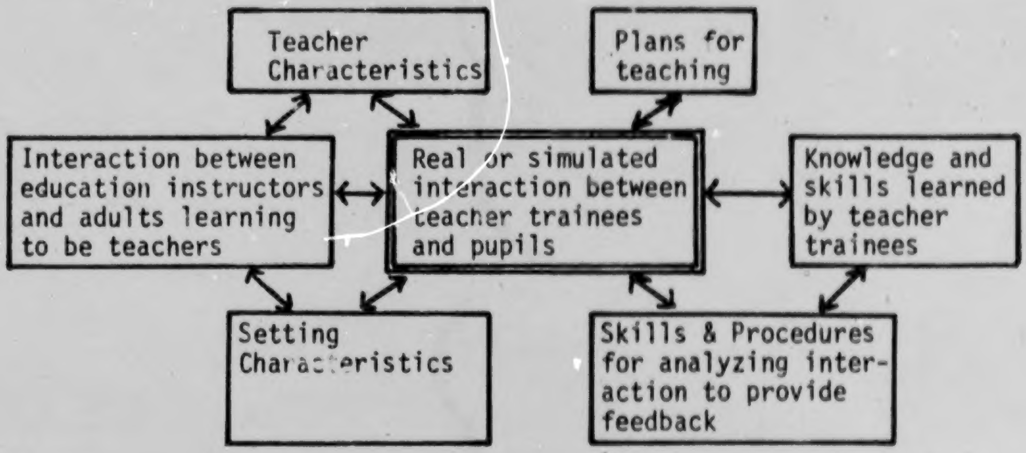
### PARTICIPANTS

Dr. Ned A. Flanders - Chairperson
Dr. Bruce Biddle
Dr. Jere Brophy
Dr. Norma Furst
Dr. Bryce Hudgins
Dr. Donald Medley
Dr. Graham Nuthall
Ms. Doris Ray
Dr. Melvyn Semmel
Dr. Robert Soar
Mr. Christopher Clark, Secretary

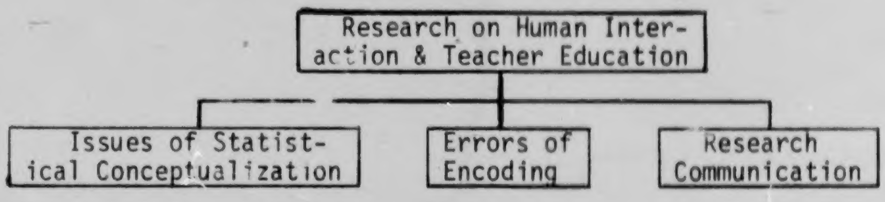
APPROACH 2.1: RESEARCH ON HUMAN INTERACTION IN EDUCATIONAL SETTINGS


Teacher education, training, and self-development
Interaction: Teacher behavior & student behavior
Learning and other outcomes
Plans for teaching and teacher characteristics
Setting characteristics and contexts
Student characteristics

APPROACH 2.2: RESEARCH ON TEACHER EDUCATION


Teacher Characteristics
Plans for teaching
Interaction between education instructors and adults learning to be teachers
Real or simulated interaction between teacher trainees and pupils
Knowledge and skills learned by teacher trainees
Setting Characteristics
Skills & Procedures for analyzing interaction to provide feedback

APPROACH 2.3: METHODOLOGICAL ISSUES


Research on Human Interaction & Teacher Education
Issues of Statistical Conceptualization
Errors of Encoding
Research Communication

## SUMMARY

The Panel on Teaching as Human Interaction organized its work around three major needs:

1. The need to create knowledge about and an understanding of the process of teacher-pupil and pupil-pupil interaction during teaching and learning.

2. The need to create knowledge and methods to improve teacher education for teaching as human interaction.

3. The need to improve the methodology and instrumentation for doing research on teaching as human interaction as well as the methods of communicating that research to educational practitioners.

## DISCUSSION

When research on teaching is viewed as human interaction, it can be represented by the six classes of variables which are shown in Figure 1.

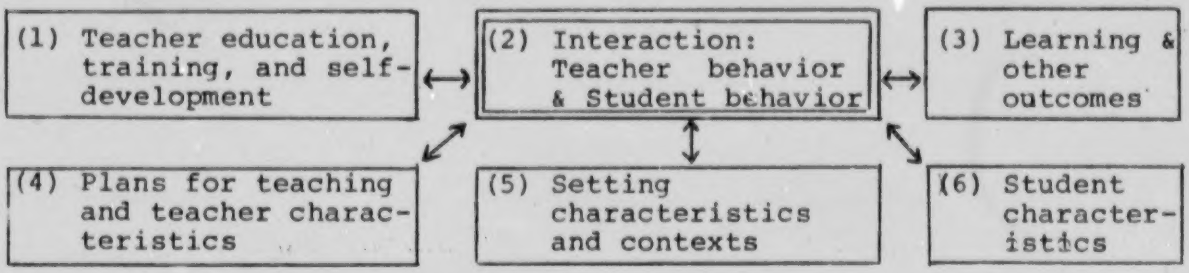

(1) Teacher education, training, and self-development
(2) Interaction: Teacher behavior & Student behavior
(3) Learning & other outcomes
(4) Plans for teaching and teacher characteristics
(5) Setting characteristics and contexts
(6) Student characteristics

Figure 1
Main Classes of Research Variables

Panel 2 included any research on teaching that analyzes the interactive behavior of pupils and teachers shown in box 2 of Figure 1. Thus, research on the interaction itself, and the associations of interaction variables with student learning and other outcomes, with student characteristics, with setting characteristics, with making plans for teaching, with teacher characteristics, and with teacher education are the concern of this Panel.

The analysis of human interaction and especially teacher-pupil interaction is of concern to this Panel in two ways: First, it is a way to discover knowledge about how the educational growth and development of pupils can be improved; second, the analysis of interaction is a method of educating and training inexperienced teachers in preservice professional programs as well as experienced teachers who must adapt new knowledge about teaching to their classrooms, their pupils, and their personal style of teaching.

The Panel's discussion began with the observation that we have made considerable progress in research on teaching during the past few decades. This has included the invention and refinement of procedures for analyzing human interaction. But too much of the research is irrelevant to pressing problems, such as the evaluation of teacher effectiveness, and most research fails to be implemented in preservice and inservice teacher education. One reason may be that the validity of knowledge statements about teaching is unknown until the question of how teachers use this knowledge is investigated. To improve education, knowledge about teaching must be understood, selected and adapted by teachers and educators in the classrooms and schools. Another view, expressed early in the work of the Panel, was that analysis of research design and methodology should be prominent in a review of research on interaction processes.

It was in this fashion tht the report of Panel 2 gradually came to regard its total plans as having three major components: first, to identify the kinds of knowledge that research on interaction processes can produce; second, to show how the utility of this knowledge can be tested by research on teacher education; and third, to make recommendations about research methodology as a guide for those who investigate interaction processes. These three components constitute the proposed research Approaches in this Panel report. The following discussions focuses on these Approaches, and the Programs and Projects which are organized under the Approaches.

## Approach 2.1: Research on Human Interaction within Educational Settings

This first Approach sets as its goal the creation of knowledge and understanding of the process of teacher-pupil and pupil-pupil interactions during teaching and learning. Five programs have been outlined as ways to acheive this goal.

The first Program, Patterns of Teacher-Pupil Interaction (2.1.1), aims at increasing our knowledge of the interaction processes which occur as a result of teaching and learning activities.

This knowledge can be developed if research progress is made in the analysis of longer chains of events, in separating events according to instructional purposes, in conceptualizing curriculum-specific interaction patterns, and in making comparisons of the explanatory power of different encoding/decoding systems.

Under this program four projects are offered as examples of ways to achieve the program goal. In Project 2.1.1.1 a data bank would be created for records of classroom interactive behavior, and would be designed to overcome present difficulties in comparing different systems of analyzing interaction progresses. The second Project (2.1.1.2) in this program is concerned with the natural history of interaction patterns in classroom groups. The goal is to learn more about how patterns of interaction change with the passage of time and the influence of group experience. This project is followed by 2.1.1.3 which would seek to develop knowledge and understanding of the ways in which teacher behaviors influence pupils and how pupil behaviors influence the teacher. Some of the activities aim at identifying: (a) how teachers perceive and conceptualize pupil behaviors, (b) how teachers' perceptions of pupil behaviors influence their choice or use of different strategies or tactics, and (c) how teachers' perceptions of pupil behaviors influence their expectations concerning pupil ability, attitude, and performance. The final Project (2.1.1.4) in this Program suggests the examination of different interaction processes as they are associated with various models of teaching and strategies of instruction. The purpose of the project would be to collect interaction data necessary to distinguish among different teaching models or instructional strategies.

The second major Program, Relationships Among Interaction Processes, Context and Setting Variables, and Pupil Characteristics (2.1.2), under the first approach was developed on the understanding that interaction processes will differ depending on school climate, curriculum, classroom equipment, and the composition and size of the pupil population. Four projects were outlined. The first Project (2.1.2.1) is established to determine the effects on interaction processes of differences in educational settings. The most urgent need is for information which teachers can use constructively. With regard to racial, ethnic, religious,SES, and sex differences, the most urgent need is to distinguish between problems which can be influenced by the different tactics available to teachers and those that can't.The second Project (2.1.2.2) in this Program seeks to determine the effects of classroom contexts on the processes of interaction. Studies falling into this project will concern themselves with variables such as the physical features of the classroom: size, degree of crowding, lighting, carpeting, and the presence and use of educational media such as television or teaching machines. In Project 3 (2.1.2.3) the goal is to determine associations between interaction processes and the immediate purposes of instruction. Investigations on this topic are concerned with the natural cycles of learning and instruction which create a context for interaction, for pupil perceptions, and for teacher perceptions. The last Project (2.1.2.4) in this Program looks at the influence of the curriculum and of the make up of the student population on interaction processes. Studies in this project will be concerned with class size, grade level, ethnic composition, ability level, social class background, and other variables associated with pupils in classrooms, as well as curriculum variables.

The third major Program, Relationships Among Teacher Variables, Interaction Processes, and Pupil Perceptions of these Processes (2.1.3), in the first Approach focuses on the development of knowledge and understanding of the relationships among teacher characteristics, teacher-made plans for instruction, interaction processes and pupil perceptions of these processes. The goal of the Program is to determine the ways in which the beliefs, attitudes, experiences, physical appearances, and other attributes of teachers affect the patterns of interaction. In the first Project (2.1.3.1), the objective will be to develop knowlege of the ways in which specific teacher purposes and beliefs about teaching result in identifiable patterns of classroom interaction. Projects within this Program would be concerned with how the teacher's beliefs and purposes result in identifiable patterns of interaction and with how these beliefs and purposes are modified by actual events in the classroom. The Program's second Project (2.1.3.2), aims to develop knowledge and understanding of the ways in which teachers' beliefs and feelings about pupils influence interaction patterns. Special attention needs to be paid to the ability of a teacher to identify differences between individual pupils, and to the ability of a teacher to accommodate indentified pupil differences. The final Project (2.1.3.3) in this Program focuses on the development of knowledge and understanding of the relationships between general teacher characteristics and the patterns of interaction which occur in the classroom.

Program 2.1.4 focuses on the relationship between teacher-pupil interaction and the effects of the interaction on pupils. The history of research in this area over the last decade has pointed out the conceptual and measurement problems of trying to relate single interaction variables with student achievement. This Program suggests seven project areas which can be used to overcome the deficiencies of past research. The first Project (2.1.4.1) aims at the design, development and evaluation of measures of learning outcomes for use in process-product research. In addition to the development of closed environment units for doing interaction research, other measuring instruments need to be developed, such as measures of positive attitudes toward the teacher and toward learning activities, schemes for observing persistence or lack of distraction, ways to measure the pupil's level of aspiration with regard to learning, etc.

Project 2 (2.1.4.2) in this Program continues the search for intervening variables of classroom interaction by looking at the immediate effects of teaching on the reactions of the pupils. A number of techniques may be recommended for this purpose including those involving stimulated recall and intensive interviewing of pupils for salient experiences in teaching, construction of criterion tests immediately after the lesson, and experimental research in which criterion tests are keyed to variations in curricular treatment. Project 3 (2.1.4.3) shifts its attention from the immediate effects to the long-term effects of teaching on the reactions of pupils. Good designs for this Program would feature utilizing longitudinal processes and measures of long-term effects.

In the fourth Project (2.1.4.4), the focus shifts to an analysis of previous completed research studies as a means of validating the process-product relationships reported in those studies. Reviews of process-product studies in the literature have identified a number of variables which seem to be related to pupil achievement gains. The purpose of this Project will be (a) to develop low-inference instruments to measure these variables, and (b) to study the relationships of these measures not only to achievement, but to other outcome measures. Project 5 (2.1.4.5) in this series is designed to test, through experimental research, the validity of assumptions, beliefs, or theories about the effects of particular patterns of classroom interaction.

Project 2.1.4.6 will seek to determine the relationship of classroom interaction to individual pupil gains. And the final Project (2.1.2.7) in this Program is focused on identifying unique interaction patterns associated with different types of learner outcomes. The data base for this Project would be a set of videotape recordings of all the interactions during the teaching of the same brief unit by a sample of secondary school teachers, plus profiles of pupil gains on a set of measures of different outcomes and data on appropriate context variables.

The fifth Program, Research on the Determinants of Teaching, Interaction Processes and the Effects of Teaching (2.1.5), is aimed at explaining the relationships between school and classroom contexts and pupil characteristics by developing explanatory theories of teaching and examining different arrangements of independent and dependent variables. In Project 2.1.5.1, the goal is to develop empirically-based, explanatory theories of teaching that accommodate the findings of prior research. Project 2.1.5.2 suggests that multifaceted studies of teaching as human interaction be used to examine many different arrangements of independent and dependent variables. Some of the pupil variables to be considered would include: pupil ability, SES, racial background, native language, self-concept, academic optimism, internality, and perceptions of teaching behavior. Setting characteristics would include characteristics of the school, classroom, and community, as well as the dynamic context of the interactive behavior. Teacher characteristics would include personal and professional characteristics, training, and the tendency to use lesson plans.

## Approach 2.2 - Research on Teacher Education

This Approach builds on the knowledge developed in research on the process of teaching as human interaction. In the first Approach (2.1) the Panel proposed a research program designed to discover associations among six classes of variables. These were detailed in Figure 1. This second Approach is organized around additional classes of variables as depicted in Figure 2.

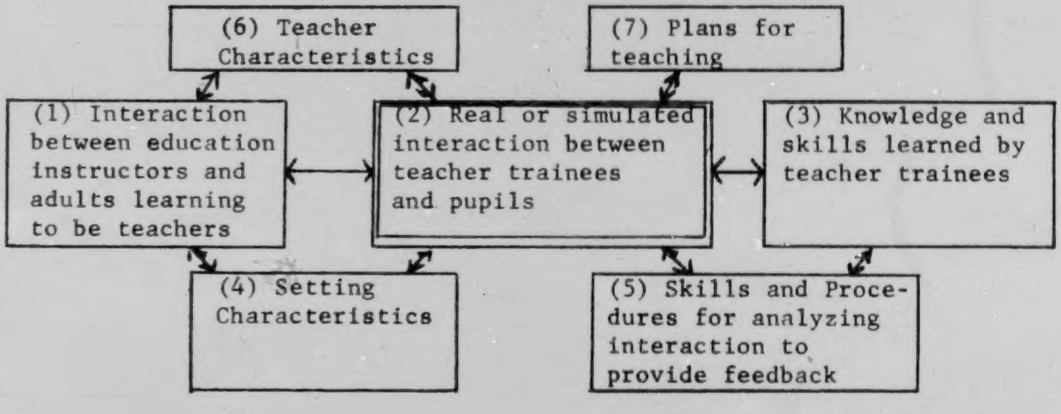

(6) Teacher Characteristics
(7) Plans for teaching
(1) Interaction between education instructors and adults learning to be teachers
(2) Real or simulated interaction between teacher trainees and pupils
(3) Knowledge and skills learned by teacher trainees
(4) Setting Characteristics
(5) Skills and Procedures for analyzing interaction to provide feedback

Figure 2
Classes of Teacher Education Variables

The major point in this Approach is that research should produce knowledge about teaching and that this knowledge can be utilized by teachers. Competent research on teacher education can address this point by (a) helping to produce more effective beginning teachers, (b) helping experienced teachers upgrade their teaching more effectively, and (c) providing a setting in which we test the utility of knowledge about teaching.

In thinking about research on teacher education, the Panel was concerned with five questions:

(1) How do teachers think about interaction and make decisions concerning their own participation?

(2) How can teachers improve their own interaction?

(3) How can the information, if it is to be used as feedback to a teacher, be improved in terms of its nature, amount, and timing?

(4) How can computer-based systems be adapted to teacher education?

(5) How can educators best respond to the demands or laws which affect the evaluation of teachers?

The Panel also offered four criteria for guiding the development of such research:

(1) Specific teacher training objectives should be stipulated in behavioral terms.

(2) Objectives should be measured in reliable and valid interactive contexts.

(3) Specified training variables, procedures, materials, sequences, and so on, should be replicable.

(4) The research should be designed to insure validation of results by including effects on students.

Three Programs are offered to deal with the issues involved in doing research on teacher education vis-a-vis human interaction.

Program 2.2.1, How Teachers Think About Interaction, is designed to examine the phenomenon that teachers are likely to modify their own interaction with pupils after analyzing their own interactions. These Projects would include studying the relationships between training teachers in the discrimination of interaction patterns and the cognitions these teachers employ in sensing and perceiving this discrimination; investigating the ways in which teacher trainees act and react within different interaction patterns; and designing and evaluating various decision-making models which apply to choices a teacher makes while interacting with pupils. Program 2.2.2 deals with the topic of computer-based systems for teacher education which suggests research that will examine the capacity of an adult to receive, process, and act on information while actively engaged in learning interaction skills. Program 2.2.3 suggests that teacher training programs could improve their training functions if they employed a systems development approach to their work. Research in this area would include the development of a rapid feedback model for teachers during their interaction with students, the development of a feasible paradigm for training and maintaining observation skills of observers within the context of both perservice and inservice teacher training programs, etc. Project (2.2.3.2) suggests studies to examine the utility of knowledge about teaching and to evaluate the extent to which motivated adults can implement this knowledge in their teaching. The final Project (2.2.3.3) in this series focuses on the development and evaluation of services for school districts which are required by law to evaluate their personnel in terms of effective human interaction.

### Approach 2.3: Issues of Methodology, Instrumentation, and and Professional Communications

Prior to developing its three Programs for this Approach, the Panel spent a great deal of time developing a statement about the areas of agreement on the methodological issues. The areas about which the Panel reached agreement are as follows:

(1) Programmatic, cumulative research that may make use of both laboratory and field studies should get top funding priority.

(2) Studies should stress multiple measures of learning outcomes in addition to subject matter achievement.

(3) Researchers should routinely plan to check for non-linear relationships.

(4) In addition, they should check for the statistical interactive effects within both independent and dependent classes of variables.

(5) Other design features should be accounted for, e.g. systematic measurement and control of variables and the replication of findings from one type of teacher, student, or setting to different types.

(6) Analyze how learning gains are distributed across different kinds of learning.

(7) Use care in selecting residual gain measures of student outcomes based on raw pretest and posttest scores.

(8) Include both high and low-inference measures of process behavior.

(9) Randomly assign or match classrooms on relevant student variables, particularly initial scores on the criterion tests.

(10) Use a large sample of teachers in field studies, and a wide range of behaviors in laboratory experiments.

(11) Use a rationally selected rather than a randomly selected teacher sample.

(12) Collect enough data to insure reliability and validity.

(13) Long-term studies are to be preferred over short-term studies.

(14) Monitor the implementation of the study through observations.

(15) Control for experimental participation effects.

(16) Insure adequate variance across classrooms on measures of interest.

(17) Insure that the teacher behavior of interest is, in fact, stable within clusters of data.

(18) Collect and preserve the original sequence of classroom interactions and data on how they were initiated.

(19) Devise scoring systems which allow direct comparisons of data, e.g., convert raw frequencies to percentage scores.

(20) Use project goals to make decisions about what to measure, and how to measure it.

Program 2.3.1 calls for commissioning a task force of qualified researchers to clarify and illustrate the issues related to the choice of units of sampling, populations, universes, and degrees of freedom in the analysis of interactive behavior. The first Project (2.3.1.1.) proposes the examination of the problems connected with sampling and generalizing from samples. For example, a question to be answered concerns the unit of sampling--the teacher, the student, a behavior episode, etc. A second Project (3.3.1.2.) proposes examing the related problems connected with defining a unit of behavior; and the final Project (2.3.1.3.) seeks to examine the problems connected with studying time series, chains of events, and models for conceptualizing chains of events as they are used to represent human interaction.

Although recognizing the problems in this area, Program 2.3.2 suggests efforts to investigate the nature of errors during encoding procedures, and to develop a model for understanding errors that can serve as a guide for different encoding systems and can show how to demonstrate the effects of errors in the analysis of human interaction. More immediately, Program 2.3.3 urges developing the means for assuring communication and the sharing of data, methods, and substantive results concerning research on teaching. At present, no adequate means are provided for gaining access to the results of the large number of research efforts which are being produced every year. Therefore, the first Project (2.3.3.1.)calls for support of an ERIC Clearinghouse for Research on Teaching so that educators can gain access to literature concerned with research on teaching. The second Project (2.3.3.2.) calls for the commissioning of regular reviews of research dealing with the processes, causes, and effects of teaching. Project 3.3.3.3 suggests the establishment and support of a Journal for Research on Teaching, and Project 2.3.3.4 suggests the commissioning of one or more conferences concerned with standards for scientific publication in research on teaching and allied fields. The final Project (2.3.3.5.) of the series calls for the establishment and support of a data bank for basic data from studies in teaching. Such a bank would solicit the deposit of data from studies of teaching already conducted and would specify the standards for deposit of those data.

# LIST OF APPROACHES, PROGRAMS, AND PROJECTS

## Approach 2.1.: Develop knowledge and understanding of human interaction within educational settings.

Program 2.1.1.: Develop new ways to conceptualize and analyze patterns of teacher-pupil interaction.

- Project 2.1.1.1. - Design and create the capability of establishing a data bank of recorded interactive behavior complete with associated paper-and-pencil test data.
- Project 2.1.1.2. - Examine the cycles of development through which interaction patterns mature.
- Project 2.1.1.3. - Develop knowledge and understanding of the ways in which teacher behaviors influence pupils and in which pupil behaviors influence teachers.
- Project 2.1.1.4. - Examine the different interaction processes associated with various models of teaching and strategies of instruction.

Program 2.1.2.: **Examine relationships among interaction processes, context and setting variables, and pupil characteristics.**

- Project 2.1.2.1. - Determine the effects on interaction processes of differences in educational settings.
- Project 2.1.2.2. - Determine the effects of classroom contexts on the processes of interaction.
- Project 2.1.2.3. - Determine associations between interaction processes and the immediate purposes of instruction.
- Project 2.1.2.4. - Determine the effects of variables concerned with the curriculum and with the compostion of the pupil population on the processes of interaction.

Program 2.1.3.: Develop knowledge and understanding of the relationships among teacher characteristics, teacher-made plans for instruction, interaction processes, and pupil perceptions of these processes.

Project 2.1.3.1. - Develop knowledge of the ways in which specific teacher purposes and beliefs about teaching result in identifiable patterns of interaction.

Project 2.1.3.2. - Develop knowledge and understanding of the ways in which teacher beliefs and feelings about pupils influence interaction patterns.

Project 2.1.3.3. - Develop knowledge and understanding of relationships between general teacher characteristics and the patterns of interaction which occur in the classroom.

Program 2.1.4.: Develop knowledge and understanding of the relationships between teacher-pupil interaction and the effects of the interaction on pupils.

Project 2.1.4.1. - Design, develop, and evaluate measures of learning outcomes for use in process-product research.

Project 2.1.4.2. - Determine the immediate effects of teaching on the reactions of pupils.

Project 2.1.4.3. - Determine the long-term effects of teaching on the reactions of pupils.

Project 2.1.4.4. - Validate the results of previously reported empirical studies of process-product research.

Project 2.1.4.5. - Provide empirical validation for widely held or well-supported assumptions or theories about the effects of particular patterns of classroom interaction.

Project 2.1.4.6. - Determine the relationship of classroom interaction to individual pupil gains.

Project 2.1.4.7. - Identify unique interaction patterns associated with different types of outcomes.

Program 2.1.5.: Determine the complex and contingent relationships among the determinants, processes, and effects of teaching through studies involving three or more variables classes.

Project 2.1.5.1. - Develop empirically-based, explanatory, theories for teaching that accommodate the findings of prior research.

Project 2.1.5.2. - Examine many different arrangements of independent and dependent variables in a multifaceted study of teaching as human interaction.

Approach 2.2: Develop knowledge and methods useful in the understanding and improvement of teacher education.

Program 2.2.1.: Investigate how teachers think about interaction and make decisions about their own participation.

Project 2.2.1.1. - Study the relationships between training in the discrimination of interaction patterns and the cognitions involved in sensing and perceiving these discriminations.

Project 2.2.1.2. - Investigage the ways in which teacher trainees act and react within different interaction patterns.

Project 2.2.1.3. - Design and evaluate various decision-making models which apply to choices a teacher makes while interacting with pupils.

Program 2.2.2.: Conduct basic research in the capacity of an adult to receive feedback information while interacting with pupils.

Project 2.2.2.1. - Conduct laboratory experimentation on the capacity of a motivated adult to receive, process, and act on different kinds of feedback information while learning how to create desired patterns of interaction.

Project 2.2.2.2. - Explore the need for autonomy while learning progressively more complex interaction skills.

Program 2.2.3.: Explore systems development for teacher education in preservice and inservice programs.

Project 2.2.3.1.: - Design, install, evaluate, and then expand the services of a regional teacher education laboratory to provide computer assisted training systems to school districts and teacher training institutions within reach of telephone networks.

Project 2.2.3.2.: - With the resources of a teacher education laboratory, examine the utility of knowledge about teaching and evaluate the extent to which motivated adults can implement this knowledge in their teaching.

Project 2.2.3.3.: - Develop and evaluate services for school districts which are required by law to evaluate their personnel in terms of effective human interaction.

Approach 2.3.: Issues of methodology, instrumentation, and professional communication.

Program 2.3.1.: Commission a task force of qualified researchers to clarify and illustrate the issues related to choices of units of sampling, populations, universes, and degrees of freedom in the analysis of interactive behavior.

Project 2.3.1.1. - Examine the problems connected with sampling and with generalizing from samples.

Project 2.3.1.2. - Examine the problems connected with defining a unit of behavior.

Project 2.3.1.3. - Examine problems connected with studying time series, chains of events, and models for conceptualizing chains of events.

Program 2.3.2.: Investigate the nature of errors during encoding procedures, and develop a model for understanding errors that can serve as a guide for different encoding systems and can show how to demonstrate the effects of errors in the analysis of human interaction.

Program 2.3.3.: Develop the means for assuring communication and the sharing of data, methods, and substantive results concerning research on teaching.

Project 2.3.3.1. - Support an ERIC Clearinghouse for Research on Teaching.

Project 2.3.3.2. - Commission regular reviews of research on the processes, causes, and effects of teaching.

Project 2.3.3.3. - Establish and support a journal for research on teaching.

Project 2.3.3.4. - Commission one or more conferences concerned with standards for scientific publication in research on teaching and allied fields.

Project 2.3.3.5. - Establish and support a data bank for basic data from studies of teaching.

D R A F T

NATIONAL INSTITUTE OF EDUCATION
OFFICE OF RESEARCH
PROGRAM ON TEACHING AND CURRICULUM

# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 3 SUMMARY

## TEACHING AS BEHAVIOR ANALYSIS

### GOAL STATEMENT

To improve teacher training and teaching effectiveness through applied behavior research in instructional settings.

### PARTICIPANTS

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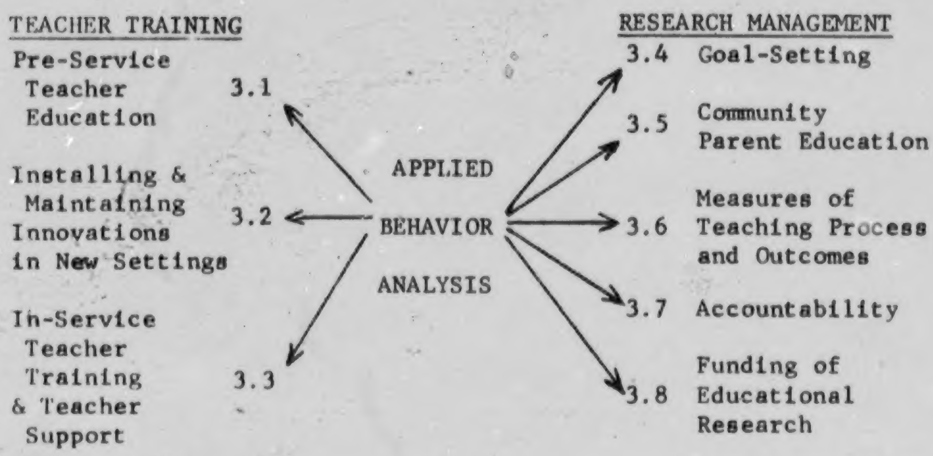
TEACHER TRAINING
Pre-Service Teacher Education 3.1
Installing & Maintaining Innovations in New Settings 3.2
In-Service Teacher Training & Teacher Support 3.3
APPLIED BEHAVIOR ANALYSIS
RESEARCH MANAGEMENT
3.4 Goal-Setting
3.5 Community Parent Education
3.6 Measures of Teaching Process and Outcomes
3.7 Accountability
3.8 Funding of Educational Research

## SUMMARY

The Panel on Teaching as Behavior Analysis organized their suggested research programs under eight approaches:

1. Increase the utilization of applied behavior analysis in the preservice education of teachers.

2. Develop procedures for installing and maintaining effective teaching and teacher education techniques and systems in new settings.

3. Examine procedures for the development of more effective teacher performance through teacher training, and for the development and improvement of existing teacher support systems.

4. Develop, through empirical research, systematic procedures that can be used to define the goals and objectives of educational programs.

5. Develop a community education training program for parents.

6. Develop and evaluate measures of teaching processes and outcomes.

7. Develop and test methods by which teachers and teacher-training institutions can make themselves more accountable for their performance.

8. Develop criteria for funding educational research which can ensure outcomes of direct relevance to teachers' instructional objectives, and which are acceptable to the community institutions involved.

## DISCUSSION

The objective of Panel 3 was to design a program of research that can improve teacher training and teaching effectiveness by further developing and utilizing that set of educational techniques known as applied behavior analysis.

Applied behavior analysis is fundamentally problem oriented. Consequently, the events and subjects of study within this field are chosen because of their social importance rather than because of their importance to theory. The conventions of behavior analysis require that it deals with physical events that are precisely measurable, and that it can claim to have analyzed a phenomenon to the extent that it can exercise control over the phenomenon in ways that can be replicated by others. These self-imposed requirements mean that applied behavior research evaluates the effect of specific procedures in a way that directly relates process and outcome variables. Further, the Panel agreed that behavioral procedures are judged effective to the extent that they: a) achieve specified goals; b) are replicable; c) are preferred by consumers; d) are practical--including economically--in the educational system and community in which they are applied; and e) are disseminable.

Empirical studies of behavior change (teaching) procedures that fall under the heading of applied behavior analysis have had a relatively brief yet productive history. Based on a number of rationales published in the 1950's, a rapidly expanding collection of empirical studies has developed systematic procedures for changing behavior through the use of contingent reward, stimulus control, environmental design, social modeling, and systematic desensitization.

It was a generally held working assumption of the Panel that in spite of (or perhaps because of) the vigorous development of behavior analysis in education, it is, at present, a technology that is sparsely utilized in the training of educational personnel or in the teaching of students. Because of this perspective, the several approaches that were identified for development tend to focus on the need for research that will contribute to the utilization of existing technology rather than research on basic concepts and methods. The most notable exceptions to this general rule are in the areas of measurement and consumer satisfaction where more basic kinds of developmental work are called for by the Panel report.

Whether the rules and conventions that define applied behavior analysis are narrow and restrictive, or are directly responsible for the effectiveness of the approach, is an interesting subject for academic debate. The various members of the Panel hold differing views on the issue. There was, however, agreement that the immediate practical needs of teachers and teacher trainers require the products of a coherent research plan shaped by those needs rather than the occasional and fortuitous benefits of unorganized investigations. The eight approaches which the Panel identified for development reflect this pragmatic concern for the current needs of educators.

Approach 3.1--Increase the utilization of applied behavior analysis in the preservice education of teachers: The educational technology developed by applied behavior analysis has particular relevance for teacher training programs. The utilization of this technology in teacher preparation is discussed in three separate and distinct areas:

1. As substantive content (i.e., increasing the amount of information trainees receive about behavior analysis in education). Now that a practical technology of classroom behavior analysis exists, effective ways must be devised to make it a part of established teacher training programs. Further, and perhaps more important, ways must be devised to experimentally evaluate the effects of including behavior analysis training at the preservice level on the initial classroom performance of teachers. In short, the question to be answered is: What behavior analysis techniques can be taught to trainees that will be most beneficial to them as teachers?

2. As a technique for developing trainees ' personal-social skills (i.e., to help trainees learn better ways of dealing with personal stress and tension). Specific programs in the area of personal-social skills training involve the evaluation of functional relationships between teacher performance and specific training in anxiety and depression as well as training in the use of social praise and other specific teaching techniques.

3. As an instructional methodology that can be used in teaching other professional and general education courses. The need for expanded research on the use of behavior analysis as a methodology for preservice training is exemplified by recent studies that have provided some extremely promising suggestions for the development of improved training strategies. Three particularly promising areas are: a) analyses of the effects of feedback to trainees, b) modeling, or role-playing, techniques, and c) analyses of the effects of PSI (Personalized System of Instruction) courses in a variety of content areas.

Approach 3.2--Develop procedures for installing and maintaining effective teaching and teacher education techniques and systems in new settings. This Approach focuses on the parallel questions of transferring experimental programs from laboratory school to classroom and maintaining the effectiveness of innovative techniques and systems once they are installed.

The experimental literature on the dissemination and maintenance of innovation in education is extremely limited. Experience with Follow Through programs and the model program for delinquent children (Achievement Place) points out some of the difficulties inherent in dissemination.

The experiences of Follow Through indicate that when procedures first tested under laboratory school conditions were moved into the field on a wide-scale basis, they had to be revised and supplemented to include (a) procedures that were more readily taught to teachers, (b) the training of teachers on a continuing basis, (c) the monitoring of both teaching procedures and on-going student progress (quality control) to guide training and maintain performance, and (d) the development of local support systems (administrative support, union support, parent support and local monitoring and training procedures).

A recent report on the dissemination of the Achievement Place model for home-like treatment centers for pre-delinquents further demonstrates the difficulties of transitions from laboratory school to field. Program procedures had to be redesigned so they would function more readily (i.e., be more easily trained for and followed), and a quality-control feedback system was required to help maintain and improve the exported systems.

Other recent reports on the maintenance of innovative systems suggest that only where the original "great man" remained involved did an innovative procedure survive over any length of time. Research on the maintenance of gains when children are moved from experimental settings back to regular classrooms shows that explicit procedures are needed to ensure maintenance of a behavior change. Extrapolation from this finding would suggest that changes produced in teacher behavior through a special intervention program might be lost over time if supportive feedback was not provided by principals, another teacher or supervisor, or by data on student behavior.

These findings indicate that a specific technology must be developed that can improve both the dissemination and the maintenance of innovative programs and procedures.

Approach 3.3--Examine procedures for the development of more effective performance through teacher training, and for the development and improvement of existing teacher support systems. Inservice training of teachers and staff development for support personnel goes on in most school districts in some form. For the most part, this training has not been subjected to experimental analysis to determine the differential effectiveness of alternative procedures. Effective ways must be designed to train teachers while they are performing as teachers.

Similarly, although workshops for teachers provide a common mechanism for updating teaching methods in public schools, the effectiveness of workshops continues to be questioned. Procedures must be developed that permit assessment of the impact of workshop strategies on the classroom performance of students and teachers.

A second area of concern within this Approach considers the roles of teacher-support personnel (psychologists, social workers, counselors, etc.) as they can assist the teacher's classroom efforts to deal with social and behavior problems. A number of recent research reports indicate that teacher support personnel who are able to assume the role of behavioral consultants to teachers can effect substantial (low cost) improvement in both teacher and student effectiveness; and, at the same time, reduce the need for special classes and therapies. Although there are some encouraging indicators, there is a serious lack of information on how to train support personnel, and on the effects of their training on subsequent teacher and student performance. An experimental analysis of various training procedures is an evident need.

In a comparable fashion the role of the curriculum specialist was considered. Although data are lacking, experience suggests that in many cases curriculum specialists have little impact on improving teacher performance in subject area instruction because their activities are largely restricted to program selection and evaluation. Missing is the training function in how to do things better.

Still another related concern is to revise administrators' roles so that they, too, more directly support teacher performance and satisfaction. Because administration at the building level is concentrated in the role of the principal, experimental analyses of the performance of this role are particularly needed. Particular emphases need to be given to experimentally specifying the ways the principal's attention can be used to alter and support teacher behavior.

Finally, there is a need to examine more carefully the relations between the processes by which teacher improvement programs are established and their effectiveness. Specifically, techniques must be devised that will increase teacher participation in the design of inservice training programs.

Approach 3.4--Develop, through empirical research, systematic procedures that can be used to define the goals and objectives of educational programs. The educational program of the public schools (and other educational agencies) suffers from inadequate definition of its goals and objectives. This deficiency makes it difficult, if not impossible, to establish criteria of program effectiveness and results in a serious lack of accountability at all levels in education. Without clear objectives it is not possible to conduct a coherent program of inservice or preservice training for teachers and teacher-support personnel, to differentiate effective from ineffective procedures, to assess the merits of proposed or achieved change, or to support or refute the contentions that the schools are irrelevant, or even harmful.

A goal statement describes an intended and desired outcome. A definition of the desired outcome also provides the primary criteria for determining and describing approximations to that outcome. Without the referent that such a statement provides, any evaluation can be dismissed as irrelevant to the "real purpose" of the school or educational program. On the other hand, if such a statement is appropriately constructed, it can serve as a basic reference point against which the current status and the progress of a program may be judged. Such judgments may be made, however, only if the goal is stated in terms that are reliably measurable.

The requirement that educational goals be stated in measurable terms does not restrict or in any way prescribe the content of the goal. The relative absence of clear statements about the humanistic and affective objectives of education in the behavior analysis field may be a comment on communications barriers within the broad field of education, but it does not indicate that objective goal statements are incompatible with humanistic or affective goals. A goal statement that is found to confine the educator too much is a poorly conceived statement and should be revised.

A variety of attempts to implement and to evaluate educational intervention programs during the past decade, including EPDA (Educational Personnel Development Act), ESEA (Elementary and Secondary Education Act), Head Start, and Follow Through, have been either successful or unsuccessful, depending on the private or post hoc criteria of various commentators. These discrepancies in judgment have served to highlight the need to state definitions of goals and objectives before the programs are initiated. At the same time, it has become evident that relevant goal statements must reflect the greatest possible collaboration of all participants in the program--educators, parents and children.

Specific goal setting is a hallmark of behavior analysis. The initial statement of a final objective (terminal behavior) coupled with continuous measurement provides an ongoing description of progress (or the lack of it) toward that objective. The procedures for developing useful goal statements are relatively standard and well understood by behavior analysts, but only for rather small scale activities that involve relatively few participants. The extent to which current procedures can be applied to the very large scale requirements of entire educational programs is an experimental question of some urgency.

Specific suggestions in this Approach include: development of a conceptual and empirical analysis of the goals and procedures of humanistic education and better translation of these into performance, and the development of acceptable measures for more abstract goals such as creativity, initiative, goal setting, and problem solving.

Approach 3.5--Develop a community education training program for parents. This Approach was not developed by the Panel. It was a recurrent topic, however, and is included here primarily to emphasize the Panel's conviction that the education of children is not a school-bound process. A variety of parent education programs that would greatly expand the educational experiences of school-age children could be fashioned.

*Approach 3.6--Develop and evaluate measures of teaching process and outcome*. Applied behavior analysis is noted for its emphasis on repeated measures of observable behavior. Generally, these measures have been reported as changes in the frequencies of academic and social behavior. A tactical strategy was initially adopted in which researchers measured observable behavior of teachers and children because it was felt that directly observable events had maximum potential for producing significant behavior change. Between 1965 and 1970, prototypes of observational systems were utilized in public schools by a number of investigators. At about the same time, evaluations of behavioral change programs were being made by analyzing achievement and rating data.

The behaviors deemed appropriate for alteration are currently shifting in response to: (a) changing educational climates, such as the open classroom and the tutorial college environment, and (b) interest in measurement and change of more complex forms of behavior such as creativity and peer-interaction.

During the past five years research has begun on measurement problems and the development of new assessment instruments, but such research is in its preliminary stages. Further, this research has only started to make contact with traditional measurement methodology relating to statistical analysis, reliability models, attitudinal scale models and validation notions such as construct and concurrent validity.

Central to all research and service needs in education are the measures by which one judges the effectiveness of a program. Consequently, there is an imperative need to develop systems which measure teacher and student behaviors in a way that will allow the researcher to systematically evaluate behavior and give teachers immediate feedback regarding themselves and their pupils.

This Approach also emphasizes the need for the development of systems which can measure the extent to which various consumers are satisfied with educational programs. If programs are effective in producing academic and social gain, but are disliked by parents (e.g., because they feel too much pressure is placed on a child), those programs will not endure. The explicit recognition of "consumer satisfaction" as a central rather than a peripheral concern is a call for the development of a badly needed, but still unavailable, measurement technology.

Other needs identified by this Approach include: measures of self-control and affect; specialized measures to describe the full range of effects achieved by PSI (Personalized System of Instruction) courses at the college level; and methodological reseach on problems of reliability and validity.

*Approach 3.7--Develop and test methods by which teachers and teacher-training institutions can make themselves more accountable for their performance.* Two terms used in the statement of the Approach should be defined. The meaning of the term accountable is indicated in the following statement: "Accountability is a relationship in which the participants agree in advance to accept specified rewards and costs on the basis of an evaluation of specified ends." (Alkin, M., and Baker, E. B., Pp. 245-6 in N. L. Gage, Ed., *Mandated Evaluation of Educators: A Conference on California's Stull Act.* Washington, D.C., Capitol Publications, 1973.) *Performance* may include what the teacher does and what effect it has on students and others.

Recently, through the Stull Act and the Rodda Act, the State of California has required that school districts institute accountability in regard to the performance of elementary, secondary, and community college teachers and administrators. Several other states are considering similar legislation. Formal accountability procedures have also been developed in applied behavioral programs, where, it appears, they can result in increased effectiveness and "consumer" satisfaction. This result might be expected, for a wealth of evidence has shown the importance of differential feedback on outcomes in leading to improved human performance.

Programs under Approach 7 will: (a) examine those conditions necessary to create a willingness to adopt and the ability to carry out accountability procedures; (b) develop clear and comprehensible criteria of accountability; (c) define optimum consequences for different performances; and (d) study the impacts of installation of accountability programs.

*Approach 3.8--Develop criteria for funding educational research which can ensure outcomes of direct relevance to teachers' instructional objectives, and which are acceptable to the community institutions involved.* This Approach assumes that methods of funding are amenable to experimental investigation and that certain factors related to funding may be crucial in determining the ultimate impact of the research. The Panel knows of no research that has experimentally evaluated the conditions of funding. Funding generally has been based on expert judgment and political priorities.

In addition to the ordinary research criteria of potential productivity and intrinsic merit, the involvement of the community that is the recipient of the research is a factor which has been severely neglected. Feedback systems could have significant impact on grant recipients regarding formulation of problems and methods of implementation and evaluation. Such systems have begun to influence behavior analysis projects, but have not been experimentally analyzed. Finally, while "consent" is a term currently in vogue, research concerning the people involved in the consent and dissent process is almost nonexistent.

Research programs aimed at aiding funding agencies in assessing research impact could include the analysis of factors such as:

1. The extent and degree of authority of various "principals" and participants in the proposal activity. (Who gets involved, when, how often, by what process, with what authority, etc.).
2. The methods by which feedback is provided to those included in the research (orally, written, practical relevance, etc.)
3. The methods by which dissent is handled (assignment of limited authority to designated figures in groups; third-party arbitration; consensus; veto power; etc.).

## LIST OF APPROACHES AND PROGRAMS

1. Increase the utilization of applied behavior analysis in the preservice education of teachers 3.1
    a. Behavior analysis as course content--develop ways to teach trainees the concepts, methods, and procedures of behavior analysis in education 3.1.1
    b. Personal-social skills training--develop a personal-social skills training program for preservice teachers (trainees) 3.1.2
    c. Behavior analysis as method--devise systems which use behavior analysis methods in the teaching of trainees 3.1.3
2. Develop procedures for installing and maintaining effective teaching and teacher education techniques and systems in new settings 3.2
    a. Dissemination specification--develop procedural specifications for program design and evaluation that will improve disseminability 3.2.1
    b. Dissemination techniques--develop procedures to disseminate new programs that will improve their implementation and maintenance 3.2.2
3. Examine procedures for the development of more effective teacher performance through teacher training, and the development and improvement of existing teacher support systems 3.3
    a. Inservice procedures--produce training procedures for generating and maintaining improved teacher performance 3.3.1
    b. Training of support personnel--expand the roles of teacher-support personnel (psychologists, social workers, counselors, etc.) in helping teachers to deal with social and behavior problems directly in the classroom. 3.3.2
    c. Curriculum specialists--expand the role of curriculum specialists and supervisors 3.3.3

d. Administrative support - revise administrators' roles and structures so that they provide more direct support for teacher performance and satisfaction 3.3.4

e. Increasing teacher participation- increase teacher participation in the design of inservice training programs 3.3.5

f. Teaching self-control -- develop a behavioral self-control skills training program for teachers and students 3.3.6

4. Develop, through empirical research, systematic procedures that can be used to define the goals and objectives of educational programs 3.4

a. Identifying participants -- develop procedures to identify those who consider themselves participants in various types of educational programs 3.4.1

b. Goal Selection by participants - develop procedures that permit participants to select general and individual goals 3.4.2

c. Setting humanistic goals - - develop a conceptual and empirical analysis of the goals and procedures of humanistic education 3.4.3

d. Goal measurement - devise methods for creating acceptable and reliable measures of attainment of participant-selected goals 3.4.4

e. Tests of planned variations --implement model programs in various types of educational programs 3.4.5

5. Develop a community education training program for parents 3.5

6. Develop and evaluate measures of teaching processes and outcomes 3.6

    a. Measures of student and teacher behavior -- develop systems which measure student and teacher behavior in a variety of educational settings 3.6.1

    b. Consumer satisfaction measures -- develop systems for measuring consumer satisfaction with educational programs 3.6.2

    c. Measures of self-control and affect -- develop measures of self-control and affective and emotional responding 3.6.3

    d. Post-elementary school measures of effect -- develop new measures of the effectiveness of high school and college education 3.6.4

    e. Problems of reliability and validity --methodological research on problems of reliability and validity 3.6.5

    f. Analyses for within-group designs-- develop data analysis methods and research designs for single-subject (single group) research 3.6.6

7. Develop and test methods by which teachers and teacher-training institutions can make themselves more accountable for their performance 3.7

    a. Preconditions for accountability -- identify and develop ways to create preconditions for accountability 3.7.1

    b. Accountability criteria -- develop procedures to establish accountability criteria appropriate to various settings and conditions 3.7.2

c. The use of consequences -- develop procedures to provide different consequences for different performances 3.7.3

d. The effects of accountability -- assess the effects of accountability procedures on various members of the school and community 3.7.4

8. Develop criteria for funding educational research which can ensure outcomes of direct relevance to teachers' instructional objectives, and which are acceptable to the community institutions involved 3.8

a. Effects of various funding procedures-- measure selected process variables as a function of the method of funding NIE proposals 3.8.1

D-R-A-F-T

NATIONAL INSTITUTE OF EDUCATION
OFFICE OF RESEARCH
PROGRAM ON TEACHING AND CURRICULUM

# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 4 SUMMARY

## TEACHING AS SKILL PERFORMANCE

## GOAL STATEMENT

The goal of this Panel is to develop the means to improve teachers' ability to perform general and specific skills of teaching within curriculum areas and student development levels.

## PARTICIPANTS

Dr. R. Turner, Chairperson
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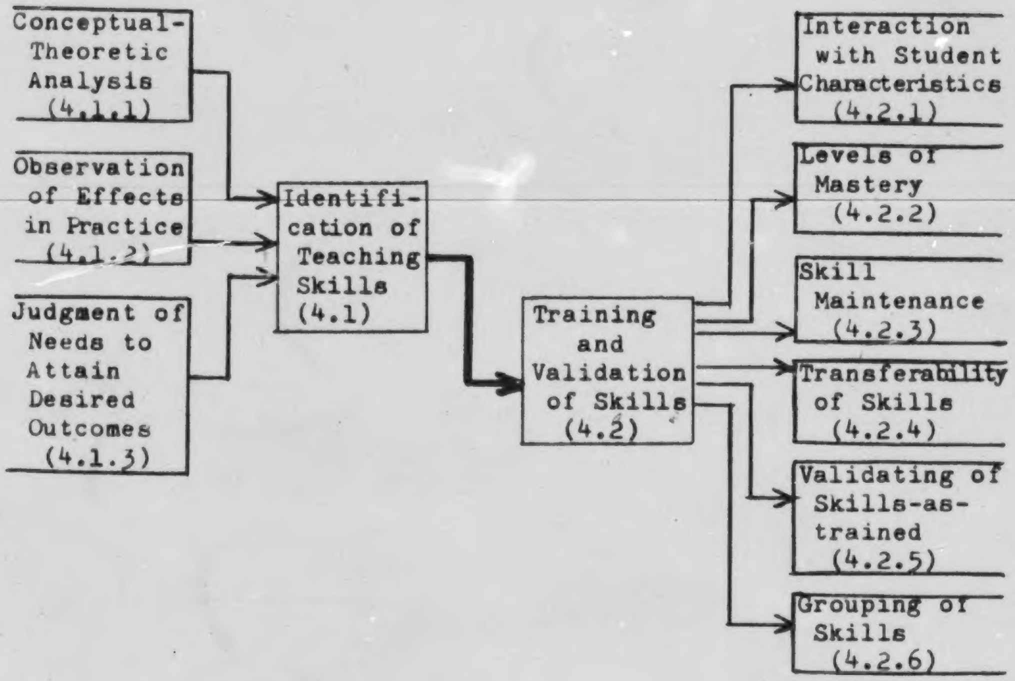

Conceptual-Theoretic Analysis (4.1.1)
Observation of Effects in Practice (4.1.2)
Judgment of Needs to Attain Desired Outcomes (4.1.3)
Identification of Teaching Skills (4.1)
Training and Validation of Skills (4.2)
Interaction with Student Characteristics (4.2.1)
Levels of Mastery (4.2.2)
Skill Maintenance (4.2.3)
Transferability of Skills (4.2.4)
Validating of Skills-as-trained (4.2.5)
Grouping of Skills (4.2.6)

## SUMMARY

The Panel on Teaching as Skill Performance focused on research to improve teacher performance of instructional skills. This research will be based on two approaches:

1. The identification of important teaching skills by: (a) utilizing theoretical statements drawn from psychological, developmental, and pedagogical theories, as well as theories of subject matter; (b) analyzing observed teacher practice into skill components and showing empirically the relation of these components to educational outcomes; and (c) utilizing reports of teachers and other persons concerning what they believe to be important teaching skills.

2. The identification of training and validation procedures which demonstrate how the teaching skills are related to educational outcomes. This approach looks at: (a) the transferability of the skills, (b) the school conditions needed to optimize maintanence of important skills, (c) the development of measures to define the effectiveness of teaching skills, and (d) the relationship of the repertoire or set of skills possessed by individual teachers to educational outcomes.

## DISCUSSION

### Definitions of Teaching Skills

The Panel began its deliberations with an attempt to develop a definition of teaching skill. Although several issues were presented and discussed, no formal definition was made by the Panel. The following aspects of teaching skills were accepted, however, as a working characterization of the term 'skill'.

> Teaching skills exist in a variety of teacher roles, e.g., in relationships with school principals, or parents, as well as with students.
>
> Teaching skills have consequences. A logical chain connects a specific skill with its consequences. The consequences can be both direct and indirect.
>
> Operationally, teaching skills are time-bound in the sense that the outcomes or consequences of a skill must be observable within a reasonable period, e.g., a school year.
>
> Specific teaching skills may be distinguished from Skillfulness. The latter includes: (a) determining what is to be done, (b) asking whether a particular skill achieves the desired effect, and (c) timing the use of a specific skill to achieve the effect.

Specific teaching skills can be rated for quality.

Normative criteria have been established for the performance of certain teaching methods which incorporate specific skills.

Teaching skills are moderated by the context or situation in which they are performed.

A skill has an intentional or purposeful aspect; i.e., there is a reason for performing a particular skill.

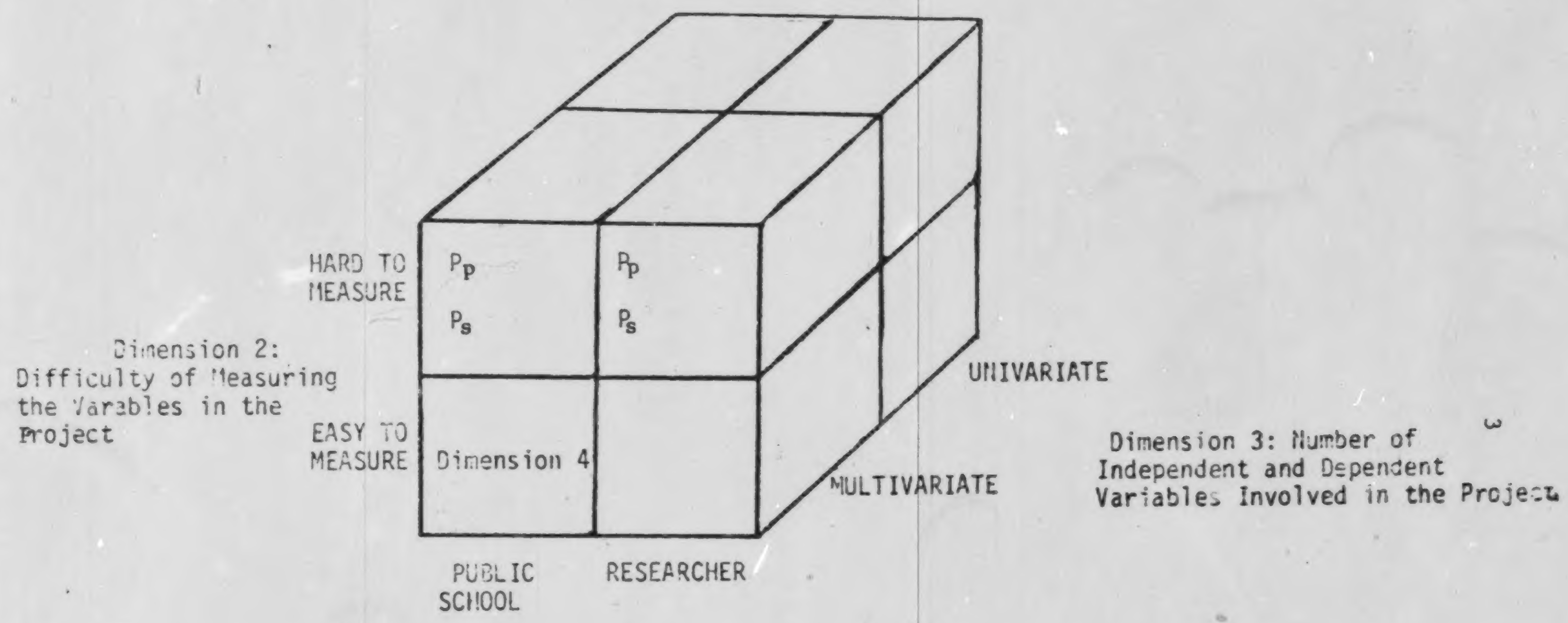
Skills of special interest to the Panel are those which are trainable, but a second group of untrainable or difficult-to-train skills (or "aptitudes") is recognized.

## Assumptions about Research in Teaching as Skill Performance

Several assumptions guided the Panel's development of approaches, programs and projects. They all specify research that has:

1. Practical value.
2. Acceptance by its potential users and the research community.
3. Potential for yielding scientific knowledge.
4. A balance between the interests of the non-research public and the research community.
5. The involvement of teachers as well as researchers in determining the skills and educational outcomes to be studied.
6. A decision-making model that optimizes support, use, and scientific payoff across a program of research. The Panel developed a matrix structure for such a decision-making model. See Exhibit 1.

This matrix has four dimensions. Each of these dimensions represents a continuum which, for purposes of display, is shown as a dichotomy in the exhibit. Dimension 1 deals with the degree to which the antecedents to the research represent public school inputs and acceptability as opposed to researcher or scientific inputs. Dimension 2 represents the ease or difficulty of measuring the dependent and independent variables. This dimension is related to Dimension 1 in that the value assigned to particular variables by public school persons or researchers may be moderated by how easy or difficult these variables are to measure. Dimension 3 represents a central feature of the research design of the project. At one extreme (univariate) only one teacher training procedure or one teacher skill and/or one pupil outcome variable would be involved. At the other extreme multiple skills and multiple pupil outcomes would characterize the design. This dimension is also related to Dimensions 1 and 2, e.g., a researcher may be attracted to designs with easy-to-measure variables of his own choosing since he can optimize control of experimental error in such designs. But such studies might be seen as having less practical value in the eyes of public school persons. Dimension 4 (represented within each of the cells of the matrix) addresses the question of research pay off. In this dimension, the decision maker must assign probabilities to


HARD TO MEASURE
EASY TO MEASURE
Dimension 2: Difficulty of Measuring the Varables in the Project
$P_p$
$P_s$
$P_p$
$P_s$
Dimension 4
UNIVARIATE
MULTIVARIATE
Dimension 3: Number of Independent and Dependent Variables Involved in the Project
PUBLIC SCHOOL
RESEARCHER

Dimension 1: Source of Inputs of Variables into the Research

**Dimension 4:**
**Probable Research Payoff**

$P_p$ = Probability of acceptance and use (practical action)

$P_s$ = Probability of scientific payoff (knowledge attainment)

EXHIBIT I A Structure for making decisions about projects related to teaching skills.

both the potential acceptance and use of the project outcomes and to their potential for contributing to scientific knowledge.

This matrix can be used to analyze a proposal by identifying in which box at each step of development the proposal falls. The structure provides a schema for seeking information about the involvement of different communities of concern and interest. It also provides a schema for checking the stage of development of the antecedent variables and their sources and of the development of the outcome measures.

What This Structure Omits. This structure omits the weights to be assigned to the elements of the structure and the decision rules.

It also omits the specific variables that might or should appear in the research program. It does not resolve methodological or theoretical issues. It simply points to choices to be made and raises the question of what criteria ought to be applied in making these choices. The Panel used the matrix to bring out choices, problems, and issues in conceptualizing a research program.

### Approach 4.1: Examine Alternative Approaches to the Definition and Identification of General and Special Teaching Skills

Research efforts under this Approach are built around three programs. In Program 4.1.1, the goal is to develop and apply a conceptual-analytic method for identifying hypotheses about effective teaching skills. In striving to achieve the goals of this first program, planners will need to utilize conceptions of instructional roles generated from the following sources: (a) the explication of theory relevant to education; (b) designs for schooling--the demands of existing school organization patterns and alternatives; (c) curriculum approaches; and (d) the intersection of two or more of these sources.

Five Projects were developed by the Panel to illustrate the work of Program 4.1.1. In the first project (4.1.1.1), the goal is to generate hypotheses about the influence of pupil characteristics on the effectiveness of teaching skills derived from a theory of inductive teaching. While there has been much ATI research and development of theoretical models relating educational procedures to pupil class, few investigations have explored the effectiveness of specific teaching skills, such as those required in inductive teaching, in terms of pupil characteristics. The second project (4.1.1.2) in this series aims at the generation of hypotheses about effective teaching skills through operationalization of John Dewey's social theory. Most attempts to apply democratic process theory to education have run into severe difficulty because essential and valid teaching skills have not been created. Hence, systematic teacher training was not developed. In the third project (4.1.1.3) the goal is to generate hypotheses about teaching skills from the study of teacher adaptation to the instructor's role in systems oriented instruction in reading (e.g., IPI, IGE). Systems approaches to early reading cannot be carried out without teacher acquisition of relevant skills. The ability of teachers to transfer skills from one role to another--as well as their ability to acquire new skills--is virtually unknown. The fourth project (4.1.1.4) in the series focuses on the development of concepts related to subject matter competence with respect to teaching. There is a need to reexamine subject matter competence so as to generate content learning strategies in the preparation of teachers. In many content areas, knowledge is substituted for procedures. The final project (4.1.1.5) the specific objective is to identify and operationally define teaching skills which are logically necessary to the achievement of moral development outcomes as defined by: (a) theoretical foundations relevant to education, (b) curricular frameworks, (c) school organization, and (d) the intersection of two or more of these elements.

The second Program (4.1.2) in Approach 4.1 proposes to examine differences in achievement levels of students, and to identify teachers' acts or strategies that affect those differences. In developing the Program, the Panel suggested three concerns: (a) skill identification, (b) characteristics of the studies to be funded, and (c) criteria for evaluating descriptive, observer-based studies designed to identify teaching skills.

Three Projects serve to illustrate this program (4.1.2). In the first project (4.1.2.1) the goal is to obtain information concerning teacher behaviors and skills in high and low achieving schools. The second project (4.1.2.2) aims to delineate those frame factors that most exert influence on the effectiveness of teaching performance. In the third project (4.1.2.3) the Panel suggests an examination and improvement in the curriculum modification skills of teachers. The specific objective of this project is to determine decision points, acts, and strategies by which teachers can adapt curricula to meet local needs.

The third Program (4.1.3) in Approach 1 seeks to examine the needs assessment and other kinds of expert opinion as a means of identifying teaching skills.

Two illustrative projects were developed as examples of the work to be done. Because the projects are similar, they are combined for purposes of this report. In the first project (4.1.3.1) studies would seek to identify teaching skills most appropriate to learning outcomes in new curricular areas. In the second project (4.1.3.2) the goal is to determine the significance of student learning outcomes and correlated teaching skills as viewed by juries of teachers and parents according to school settings. Practitioners and clients (parents and students) should be involved in helping to identify the skills that teachers need for teaching students. There exists no reference document cataloging teaching skills; the learner outcomes and teacher skills must be identified and defined by teachers and parents in terms of language and concepts which both groups can understand.

## Approach 4.2: Examine Alternative Approaches to the Training and Validation of General and Specific Teaching Skills

This second Approach moves from identifying teaching skills to the use and testing of those skills in teacher training. Six programs are offered to specify the scope of work involved. In the first Program (4.2.1) the objective is to examine changes in the effectiveness of skills caused by differences in pupil characteristics, including the determination of the smallest effective stimulus for eliciting a pupil response and the appropriate metrics for measuring skills. One project was developed as a sample of the work to be done. In Project 4.2.1.1 the Panel proposed to study the association between variations in skill magnitudes (variations in hypothesized effective stimuli) and learner outcomes in reading at three grade levels. The specific objective of this project is to determine whether variation in skill magnitudes are correlates of on-task behavior and residual gain in reading.

In the second Program (4.2.2) the goal is to analyze training strategies to determine which effectively produce acquisition of a skill at each and all levels of skill acquisition, using variation in training as the independent variable and level of skill acquisition as the dependent variable. Four levels of skill acquisition are to be studied: (a) the cognitive level, (b) the unit acquisition level, (c) the unit fixation level, and (d) the autonomous level. One project was developed as a sample of the work to be done. In project 4.2.2.1 the specific objective is to determine which training procedures are most effective in bringing trainees up to different levels of acquisition of different types of teaching skills. The second Program (4.2.3) in this series seeks to determine the conditions (e.g., student characteristics and socio-political contexts) which maintain teaching skills. Little is to be gained from training pre-service or in-service teachers on specific teaching skills if these skills atrophy, or become distorted during extended classroom experience. Thus, investigation of the conditions that foster skill maintenance and improvement in actual teaching practice is needed to achieve the Panel's goal. Two projects were developed as sample work units. In Project 4.2.3.1 the goal is to examine the influence of contextual factors on the maintenance of skills in the teaching or reading and mathematics: What factors in the social organization of the school (e.g., the amount and quality of administrative supervision, effective working relations among teachers, etc.) influence the development and maintenance of specific teaching skills? Can in-service training geared to skill maintenance reduce or prevent decline in skill performance?

In the second project (4.2.3.2) the goal is to review and synthesize the literature on student influence on teacher behaviors and skills. This project should yield a system for classifying the types of student behaviors which influence teachers and the type of teacher behaviors which are influenced. In addition, the project should yield suggestions as to the independent variables that have the greatest impact. The specific objective would be to synthesize the literature and produce a quasi-taxonomy of student influence (independent) variables.

The goal of the fourth Program (4.2.4) is to determine the transferability of teaching skills, i.e., the level at which a skill is performed in one context when it has been trained in a different context. The purpose of this program is to examine what happens to teacher activities in relation to pupil outcomes when the context changes. A simple example is the question of what happens to the activities of a teacher who has learned to teach children reading in a "traditional" setting but is placed in an "Open" classroom? What skills are transferable into the new situation in order to effect learning? Two projects were developed as a work sample. In the first project (4.2.4.1) the specific objective would be to determine what adaptations of successful teaching have to be made when assumptions about the curriculum are changed. In Project 4.2.4.2 the aim is to develop the means to improve the transfer of hypothesized generic skills within an instructional approach (model) across subject matter areas. The specific objective for this project is to test the transferability of the teacher's pupil-assessment skills, goals-setting skills, instructional-strategy skills, and achievement-evaluation skills across subject areas.

Program 4.2.5 seeks to examine the validity of teaching skills-as-trained. While this program was not developed in any detail, the Panel did recognize major methodological problems in validating skills-as-trained, in finding alternative training procedures to circumvent these problems, and in attempting to increase the effects of (variance attributed to) teacher skills. One sample illustrates the types of projects to be included in Program 4.2.5. In project 4.2.5.1 the specific objective is to determine whether immediate feedback from students on some aspect of the teacher's performance will lead to changes in teacher behavior and related learner outcomes.

The final Program (4.2.6) in the second Approach seeks to examine the teacher's repertoire of skills, including its scope, organization, effect on student outcomes, and relation to teacher characteristics.

Two projects were developed to explore some of these dimensions. In project 4.2.6.1 the specific objective is to determine the effects upon learning outcomes of teacher use of higher cognitive questions both with and without the support of follow-up teaching skills, e.g., prompting, probing and redirection. In project 4.2.6.2 the goal is to examine the effect of teaching skill repertoire, organization and sequence on outcomes in pupil achievement and attitudes. Most studies that have examined effects of teaching skills on pupil outcomes look at very small, discrete units or sets of skills. Most of these studies have failed to demonstrate empirically that the skills in question have an appreciable effect on students. The small units and restricted nature of the skills examined may have caused the lack of effects. Thus, there is a need for studies that examine the potential effects of broad sets of skills that are linked together into a conceptual whole.

## List of Panel Four Approaches, Programs and Projects

Approach 4.1: Examine alternative approaches to the definition and identification of general and special teaching skills.

Program 4.1.1: Develop and apply a conceptual-analytic method for identifying hypotheses about effective skills.

Project 4.1.1.1: Examine the Influence of Pupil Characteristics on the Effectiveness of Teaching Skills Derived from a Theory of Inductive Teaching.

Project 4.1.1.2: Generate Hypotheses About Effective Teaching Skills through Operationalzation of John Dewey's Social Theory.

Project 4.1.1.3: Generate Hypotheses about Teaching Skills from the Study of Teacher Adaptation to the Instructor's Role in Systems Oriented Instruction in Reading (e.g. IPI. IGE)

Project 4.1.1.4: Develop the Concepts Related to Subject Matter Competence with Respect to Teaching.

Project 4.1.1.5: Identify Teaching Skills that are Logically Related to Advancing Learner's Level of Moral Development.

Program 4.1.2: Examine differences in achievement levels of students and identify teachers' acts or strategies that affect those differences.

Project 4.1.2.1: Use Inductive Methods to Determine Teaching Skills from Observational Surveys of Teachers in High-and-Low-Achieving Schools.

Project 4.1.2.2: Determine Relationships Between Frame Factors and the Effectiveness of Teaching Skills.

Project 4.1.2.3: Examine and Improve the Curriculum Modification Skills of Teachers.

Program 4.1.3: Examine needs assessment and other expert opinion as a means of identifying skills.

Project 4.1.3.1: Identify Teaching Skills Most Appropriate to Learning Outcomes in New Curricular Areas.

Project 4.1.3.2: Determine Significance of Student Learning Outcomes and Correlated Teaching Skills as Viewed by Juries of Teachers and Parents According to School Settings.

Approach 4.2: Examine alternative approaches to the training and validation of general and specific teaching skills.

Program 4.2.1: Examine changes in the effectiveness of skills caused by differences in pupil characteristics, including the determination of the smallest effective stimulus for eliciting a pupil response and the appropriate metrics for measuring skills.

Project 4.2.1.1: Study the Association Between Variations in Skill Magnitudes (Variations in Hypothesized Effective Stimuli) and Learner Outcomes in Reading at Three Grade Levels.

Program 4.2.2: Determine which training strategies effectively produce acquisiton of a skill at each of its levels, using variation in training as the independent variable and level of skill acquisiton as the dependent variable.

Project 4.2.2.1: Determine the Effectiveness of Different Training Procedures for Developing Different Mastery Levels in the Training of Various Types of Skills.

Program 4.2.3: Determine the conditions (e.g., student characteristics and socio-political contexts) which maintain teaching skills.

Project 4.2.3.1: Examine the Influence of Contextual Factors on the Maintenance of Skills in the Teaching of Reading and Mathematics.

Project 4.2.3.2: Review and Synthesize the Literature on Student Influence on Teacher Behaviors and Skills.

Program 4.2.4: Determine the transferability of skills, i.e., the level at which a skill is performed in one context when it has been trained in a different context.

Project 4.2.4.1: Examine the Changes Teachers Make When Operation Under Different Curricular Assumptions.

Project 4.2.4.2: Develop the Means to Improve Transfer of Hypothesized Generic Skills Within an Instructional Approach (Mode) Across Subject Matter Areas.

Program 4.2.5: Examine the validity of teaching skills-as-trained.

Project 4.2.5.1: Examine Continuous Feedback from Students on a Single Teacher Behavior Variable as a Means of Changing Instructor Behavior and Student Outcomes.

Program 4.2.6: Examine the teacher's repertoire of skills, including its scope, organization, effects on student outcomes, and relations to teacher characteristics.

Project 4.2.6.1: Determine the Effects on Learning Outcomes of a Teaching Strategy Combining Higher-Cognitive-Level Questioning, Prompting, Probing and Redirection.

Project 4.2.6.2: Examine the Effect of Teaching Skill Repertoire Organization and Sequence on Outcomes in Pupil Achievement and Attitudes.

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NATIONAL INSTITUTE OF EDUCATION
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PROGRAM ON TEACHING AND CURRICULUM

# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 5 SUMMARY

## TEACHING AS A LINGUISTIC PROCESS IN A CULTURAL SETTING

## GOAL STATEMENT

To develop the Means to Improve the Teacher's Work on the Basis of Improved Understanding of Linguistic Phenomena in School Settings.

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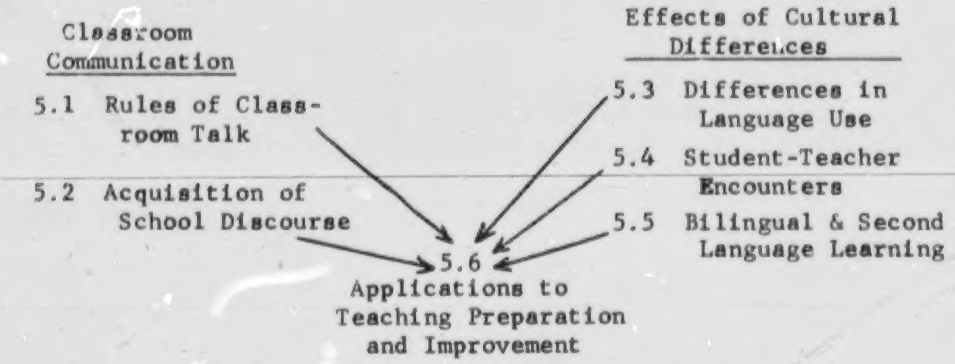

Classroom Communication

5.1 Rules of Classroom Talk

5.2 Acquisition of School Discourse

Effects of Cultural Differences

5.3 Differences in Language Use

5.4 Student-Teacher Encounters

5.5 Bilingual & Second Language Learning

5.6 Applications to Teaching Preparation and Improvement

## SUMMARY

The Panel on Teaching as a Linguistic Process in a Cultural Setting organized its research approaches and programs under three questions:

1. In what ways is effective communication in the classroom different from ordinary, everyday talk to which all children are enculturated?

2. What particular communication problems are encountered when the participants come from different cultural backgrounds?

3. How can the teacher's work be improved on the basis of the understandings achieved in the above research?

## DISCUSSION

The study of linguistic phenomena in school settings should seek to answer educational questions. This Panel is therefore interested in linguistic forms only insofar as through them we can gain insight into the social events of the classroom and thereby into the understandings which students achieve. Our specific interest is in the social contexts of cognition: speech unites the cognitive and the social. The actual (as opposed to the intended) curriculum consists of the meanings enacted or realized by a particular teacher and class. In order to learn, students must use what they already know so as to give meaning to what the teacher presents to them. Speech makes available to reflection the processes by which students relate new knowledge to old. But this possibility depends on the social relationships and the communication system which the teacher establishes.

The basic assumption that underlies all of this Panel's approaches is that language (verbal and non-verbal) is more than a medium for referential communications. In contrast to computer languages, for example, the form and structure of what is said in natural languages and the speaker's selection among verbal and non-verbal alternatives significantly influence the interpretation of meassages and thus the results of education. This assumption is basic to modern linguistics, cognitive psychology, cognitive anthropology, and ethnography which are the core disciplines relevant to the work of this Panel.

We have considered the special domain of our Panel to include three questions. The first question asks, " *In what ways is effective communication in the classroom different from ordinary, everyday talk to which all children are encluturated?*" Approaches 1 and 2 address this question.

*Approach 1* calls for continued basic research on ways of describing classroom talk. Mindful of the many analytic schemes now in existence, we are not recommending further proliferation of *ad hoc*, non-theoretical work. But we are convinced that recent theoretical insights in the core disciplines offer new and promising approaches.

*Approach 2* calls for research in a virtually untouched area: how children learn to talk appropriately in school. It is only when a "stumble" occurs in the normal flow of talk that one is aware that rules do exist for the classroom discourse "game," and that children have to learn them. For example, the following occurred in a middle-class preschool:

> T: (referring to yesterday's cooking experience) *What did we put in the soup?*
>
> C: (gives a questioning look)?
>
> T: repeats question with smile.
>
> C: *Dunno, What?* (continuing conversation with a smile as if to say, "OK, let's play together.")
>
> T: (Giggling and looking embarassed). *No, you tell me* (Elsa Bartlett, personal communication).

While it is appropriate for a child to say he doesn't know the answer to a teacher's question, it is not appropriate in school, as it might be at home, for the child to ask the adult to provide the answer. More general documentation of the need for continued rule learning comes from situations of discontinuity within the school experiences itself--e.g., when first grade teachers complain that children who have been in Headstart don't know how to behave in school (verbally as well as nonverbally); or when older grade teachers complain that children haven't learned how to work in committees.

The second question (especially significant for NIE's goal of supporting maximal educational opportunities for all) asks, "*What particular communication problems are encountered when the participants come from different cultural backgrounds?*" Program 5.12 and Approaches 3, 4, 5 are addressed to various aspects of this question.

Program 5.12 calls for research on the "frame factors" (i.e., the variables that constitute the context within which classroom discourse occurs) which influence classroom discourse. Since student and teacher characteristics are included among these frame factors, this approach subsumes such phenomena as the interaction between the structure and size of the classroom group and the cultural backgrounds of students. For example, Bellack, et al. (1966) reported a high consistency of certain features of classroom discourse across classrooms, including a very high proportion of "soliciting" moves made by the teacher. In different research traditions, this teacher-soliciting-pupil responding pattern has been shown to be ineffective and even detrimental to the participation of Black children, Hawaiian children, and American Indian children. To design more powerful educational environments, we need more information about how different children respond in a wide variety of situations.

Approach 3 includes three more specific aspects of cultural differences in language use: comparisons of language use in school and at home; the phenomenon of language mixing as it occurs in bilingual and bidialectal classrooms; and a suggestion for the development of one curriculum area, science, for expanding children's discourse repertoire. While any lesson can be used for this purpose if the children retain a dual focus on subject content and discourse process, Science seems to be an especially useful context because of its particular communicative demands and the relative value neutrality of its content.

Approach 4 examines differences in the quantityand quality of encounters between teachers and children in which knowledge and skill is or is not transmitted. The hypothesis behind such research is that the distribution is usually unequal, that such inequality is based on the cultural identities and values of the participants, and that qualitative differences in the verbal and nonverbal aspects of the encounters (the covert message) are as important an influence on learning as the frequency of the encounters themselves. For example, a teacher or guidance counselor can tell a pupil about what it takes to be a doctor, and yet convey, in subtle aspects of the adult's verbal and nonverbal behavior, that that role is not for the pupil.

Approach 5 deals specifically with interaction in bilingual classrooms. Problems in learning, and therefore in teaching, encountered by children who do not understand English are being discussed at all levels of educational decision-making, up to the Supreme Court (e.g., Lau vs. Nichols). Both Court decisions and legislation in many States have mandated improved teaching techniques for children of limited English-speaking ability.

Moreover, recent research findings indicate that a second language, like a first language, may be learned better from being used in specific types of natural communication situations. Knowledge about the specific characteristics of classroom discourse conducive to second language learning is important for the general school curriculum as well as for special language classes. Approach 5 seeks to determine those aspects of classroom discourse that can contribute most to second language learning and have least effect on first language loss.

We do not in any way imply that the problems of non-English speaking children deserve more research attention than the problems of children who speak a non-standard form of English. Bidialectal and bilingual settings share an important characteristic: the participants' attitudes toward language differences are at least as important as the extent of the linguistic differences themselves. Both are high priority settings for all our proposed research.

Aspects of the question addressed in Program 5.12 and approaches 5.3, 5.4 and 5.5 are separated here for presentation purposes only. Any one research project might involve variables that are separated here.

The third question asks, "How can the teacher's work be improved on the basis of the understandings achieved in the above research?" Because we believe that the most potent effect comes through a teacher's analysis of her own behavior rather than by the presentation of substantive findings in any pre-or in-service course, there is a particularly important relationship between all of the above research and our suggestions for teacher training. In short, we want to teach teachers to be their own informal ethnographers. Thus, effective methodologies for analyzing any aspect of classroom discourse will not only yield substantive information, but also constitute procedures that may be adaptable for teacher training in self-analysis.

Recommendations for research on how to help teachers interact more effectively could have been appended to each of the proceeding approaches. They are separated here partly for simplicity of presentation and, more importantly, because any one project to change classroom interaction patterns may draw on findings and methodologies from several approaches, not just one alone. Take, for example, the findings of the U.S. Commission on Civil Rights (1973) Mexican-American study that teachers in bicultural southwestern classrooms respond more often to Anglo children than to Mexican-American children with acceptance and praise. It seems unlikely that these interaction patterns can be changed simply by getting the teachers to distribute their praise more equally. We assume that teacher-student interaction is a two-way interactive system, and that the teacher needs help in understanding not only what she is doing (Approach 5.1), but also what the children are doing and why (Programs 5.3.1 and 5.3.2) and how children can be helped to acquire new communication strategies (Approach 5.2).

In making these recommendations, we recognize that, in the end, it is necessary to show the effects of these linguistic, or discourse, processes on what children learn about substantive knowledge and skills, about themselves and their society, about their conceptions of self as learner. We also recognize that we are asking NIE to invest further in a field where few analyses have so far been able to show such effects. Our hopes for increased understanding, and thereby improvement of the teaching process, rest on three arguments. First, that more powerful analyses of linguistic phenomena are being, and can further be, developed; second, that wherever possible, studies on classroom discourse must differentiate more than they have in the past among the communicative roles that children play as subgroups and individuals, rather than consider them as a total classroom group; and third, that research should compare classroom interactions selected on some criterion of effectiveness. Each of these arguments deserves further comment.

In any research dealing with communication, the data and methodology are inseparably connected with the research topic and research goal. Given the present state of socio-and psycho-linguistic theory, it is impossible and premature to agree on a definitive set of valid and analyzable variables. Possible linguistic variables include the following (in an unordered list):

1. Content categories (words or phrases) occurring in texts and measured in terms of frequency, co-occurrence, or type-token ratio.

2. Discourse structure, sequence, and strategies seem as moves in a Wittgensteinian language game.

3. Rules governing the selection of phonological, syntactic, or semantic variables.

4. Lexical structure as studied by cognitive anthropologists and psychologists.

5. Non-verbal channels and signs used in interaction.

Which variable is selected depends on the question being asked. While many of our approaches and programs deal with discourse structures, Approach 1.2 might involve content categories and lexical structures when frame factors of subject matter and forms of knowledge are involved; Approach 5.2 on code switching involves the rules governing the selection of phonological, syntactic, or semantic variables; and Approach 5.4 on the distribution in quantity and equality of educational encounters would also require the analysis of nonverval channels and signs. It is obvious that the expertise required of the investigator, and the equipment and time needed, will vary in each case. Wherever possible, practicing teachers should be collaborators in the research, because it is their judgments as participants that we seek to understand.

The unit of analysis for speaker or listener should be less than the classroom group taken as a whole. The use of such units is possible with existing analytic schemes, but it is too rarely done. No educational "treatment" is homogeneous with respect to all children even in "traditional" classrooms, and "open" classrooms with more student selection of activities increases that heterogeneity to the point where each child is getting (in part by constructing) his own curriculum, including the amount and type of his interaction with peers and teachers. This differentiation may be patterned along lines of ethnicity (United States Commission on Civil Rights 1973

Mexican-American Study); some perceived evidence of ability; sex or some combination of these and other characteristics. Such patterns can be discovered only if information on the identity of individual participants is maintained. Once they are discovered, further research is possible to explain why they occur and how they might be changed.

How do we arrive at some criterion of effective discourse? Ultimately, we want to relate aspects of linguistic processes in the classroom to children's learning (see Piestrup, 1973, for an almost unique example of relationships bewteen (a) features of teacher-child interaction in the teaching of reading and (b) reading achievement). A helpful analogy may be provided by research on the effects of drugs; doctors need to know main effects and side effects, intended and unintended outcomes, on patients with particular characteristics. Similarly, information is needed on the effects of particular interaction patterns. Such information is essential for informed decisions by teachers themselves and by others who are involved in the selection and pre-and in-service training of teachers. But we realize that at this point we share with all evaluation research the weakness of available outcome measures, especially measures of more subtle and more long-term effects.

Two alternative strategies are possible. One is to build into any classroom interaction research a comparison between classrooms which have been independently judged to be more or less effective on some criteria, even if actual learning outcome measures are not available. The judgments of teachers and even children can be used. Rosen and Rosen (1972) quoted extensively from classroom discourse selected as exemplary by sensitive teachers. Lein observed a teacher considered "their favorite" by Black migrant children in Florida. She comments:

> " Sitting in his class, I realized how difficult it would have been for me to cope with his teaching style had I been in his fifth grade. His speech was full of threats, and his manner seemed challenging and intimidating to me. However, the migrant children spoke to him spontaneously and participated actively in his class."
> (1973, pp. 143-4).

It would be important to analyze the interaction of such teachers in more detail.

Alternatively, one can decide to work with process rather than product indices of the quality of classroom language. Such process measures might include some internal criterion of "coherence," measures of increased communication (either in more equal distribution of talk, or decreased misinterpretations of the talk that does occur), or qualitative evaluations of the cognitive level of children's contribution to the discourse.

## REFERENCES

Bellack, A. A., Kliebard, H. M., Hyman, R. T., & Smith, F. L., Jr. The language of the classroom. New York: Teachers College Press, 1966.

Lein, L. Black American migrant children: Their speech at home and school. Paper presented at annual meeting of the American Anthropological Association, New Orleans, December 1973 (Taken from speech and setting: American migrant children in school and at home. Unpublished doctoral dissertation, Harvard University, 1973).

Piestrup, A. M. Black dialect interference and accomodation of reading instruction in first grade (Monograph No. 4). Berkeley: University of California, Language Behavior Research Laboratory, 1973.

Rosen, C., & Rosen, H. The language of primary school children. Baltimore: Penguin Books, 1973.

U.S. Commission on Civil Rights. Teachers and students. Report V: Mexican American Education study, difference in teacher interaction with Mexican American and Anglo students. Washington, D. C.: U. S. Government Printing Office, March 1973.

## LIST OF APPROACHES AND PROGRAMS

I. In what ways is effective communication in the classroom different from ordinary talk to which all children are enculturated?

1. Determine the Rules Governing Discourse and the Relationships between Classroom Discourse and Frame Factors in the Institutional Setting of the School. 5.1

a) Investigate the nature of rules governing classroom discourse by developing and adapting measurement instruments 5.1.1

b) Determine ways in which classroom language varies as a function of frame factors, and their interaction the institutional setting of the school [assuming that classroom discourse is patterned , and not randomly organized]. 5.1.2

2. Study the Acquisition By Students of Rules for School Discourse. 5.2

a) Determine which aspects of the classroom serve to facilitate or hinder the learning of appropriate discourse and interaction rules [ e.g., teacher - child ration; curriculum content, etc.].

b) Determine which aspects of the classroom serve to facilitate or hinder the learning of appropriate discourse and interaction rules by students who are members of a specific socio-ethnic group.

II. What particular communication problems are encountered when the participants come from different cultural backgrounds?

3. Determine the Ways in Which Differences in Dialect, Language Style, and Interactional Norms Affect Learning in the Classroom. (These differences may be between teachers and pupils and/or among pupils .) 5.3

a) Compare children's interaction patterns in multiple settings, out of school as well as in school. 5.3.1

b) Determine how two languages or dialects are combined in a classroom and how language and dialect differences are exploited for comminicative ends through code and style switching. 5.3.2

c) Explore science as a curriculum context for teaching children to use more context-independent speech. 5.3.3

4. Describe and Analyze Patterns of Student-Teacher Communication in order to Determine the Effect of the Social Identity of the Participants on the Way in Which Teachers Overtly and Covertly Present Information. Additionally, Analyze the Effect of Such Differential Presentations on the Acquisition of Knowledge and Skills. 5.4

5. Specify the Critical Components or Characteristics of Natural Communication Situations that are Necessary for the Acquisition of Communicative Skills in a Second Language, such that Second Language Learning Can be Enhanced Through Classroom Discourse Within the General School Curriculum and in Special Language Classes. Specify Discourse and Interaction Rules and Behaviors in School that will Encourage Native Language Maintenance. 5.5

III. How can teacher's work be improved on the basis of the understandings achieved in the above research?

6. Develop and Field Test Materials and Procedures to Improve Teaching and Thereby Learning on the Basis of Knowledge about Linguistic Processes in the Classroom. 5.6

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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 6 SUMMARY

# TEACHING AS CLINICAL INFORMATION PROCESSING

## GOAL STATEMENT

To develop an understanding of the mental life of teachers, a research-based conception of the cognitive processes that characterize that mental life, their antecedents, and their consequences for teaching and student performance. Such cognitive processes include perception, expectancies, diagnostic judgment, prescription and decision-making. Such an understanding can be applied in further research on teacher selection, teacher education, and the development of technological or staffing innovations congruent with ways teachers think and feel.

## PARTICIPANTS

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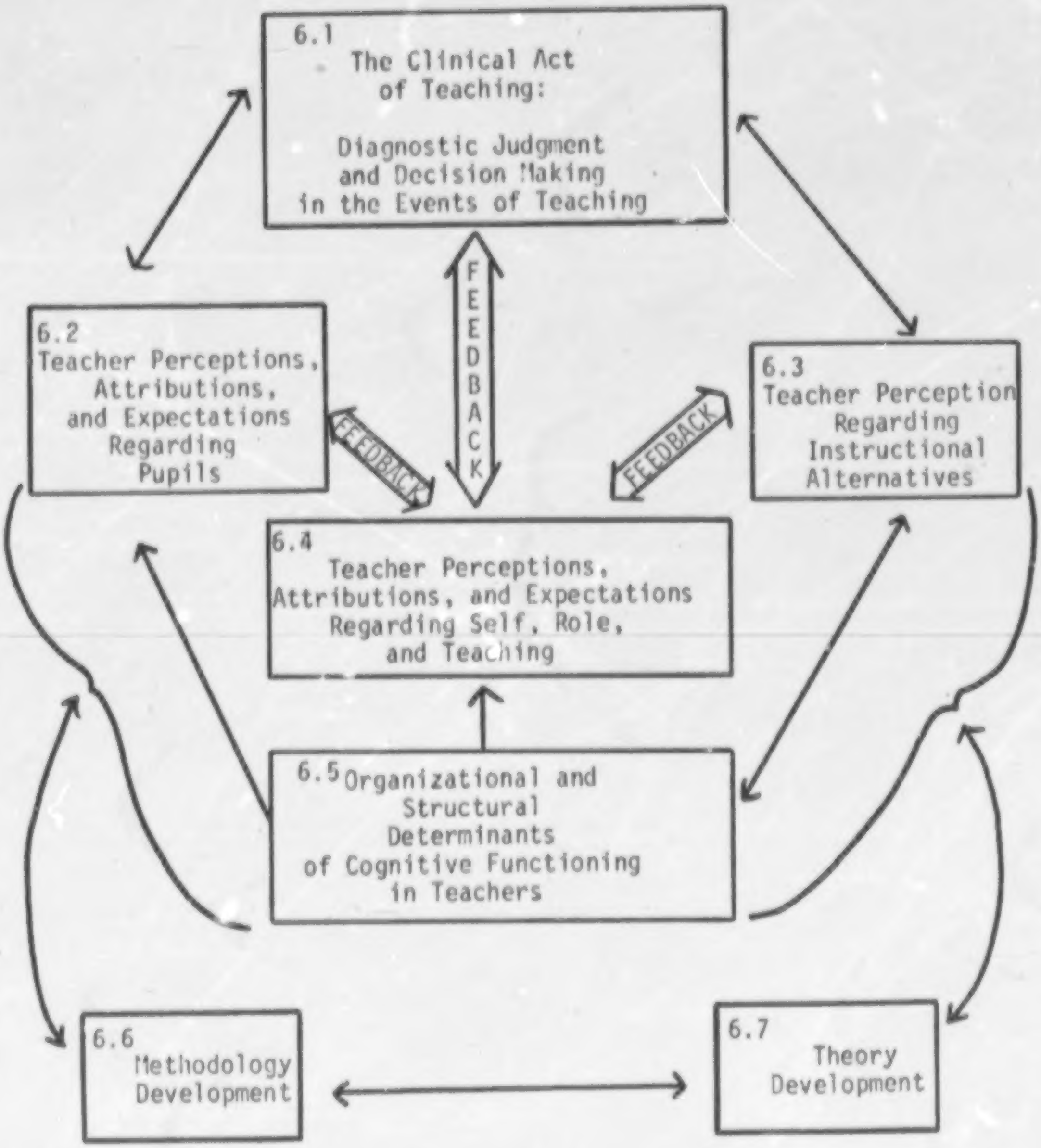
Dr. Sara Lightfoot
Dr. Greta Morine
Dr. Ray Rist
Dr. Paul Slovic
Dr. Bernard Weiner
Mr. Ronald Marx, Secretary


6.1
The Clinical Act of Teaching:
Diagnostic Judgment and Decision Making in the Events of Teaching
FEEDBACK
6.2
Teacher Perceptions, Attributions, and Expectations Regarding Pupils
FEEDBACK
6.3
Teacher Perception Regarding Instructional Alternatives
FEEDBACK
6.4
Teacher Perceptions, Attributions, and Expectations Regarding Self, Role, and Teaching
6.5 Organizational and Structural Determinants of Cognitive Functioning in Teachers
6.6
Methodology Development
6.7
Theory Development

## SUMMARY

The Panel on Teaching as Clinical Information Processing organized their research programs under seven approaches:

1. The clinical act of teaching: diagnostic judgment and decision-making in the events of teaching.
2. Perceptions, attributions, and expectations.
3. Cognitive processes in selecting among instructional and organizational alternatives.
4. Teacher perceptions of self, role and teaching: reflection and feedback.
5. Organizational and structural determinants of cognitive functioning in teachers.
6. Development of research methods.
7. Theory development.

## DISCUSSION

The approaches and programs of research described by this Panel rest on the assumption that we need to know far more than we now do about the mental life of teachers. Though it is possible, and even popular, to talk about teacher behavior, it is obvious that what teachers do is directed in no small measure by what they think. Moreover, it will be necessary for any innovations in the context, practices and technology of teaching to be mediated through the minds and motives of teachers. To the extent that observed or intended teacher behavior is "thoughtless," it makes no use of the human teacher's most unique attributes. Such behavior becomes mechanical and might well be done by a machine. If, however, teaching continues to be done by human teachers (and in all likelihood it will), the question of the relationships between thought and action becomes crucial.

This emphasis on the cognitive functioning of teachers is consistent not only with the realities of classroom life, but with important developments in contemporary behavioral and social science. One behavioral scientist, Herbert Simon, has observed:

> The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world--or even for a reasonable approximation to such objective rationality. [After proposing the principle of "bounded rationality" to describe man's limited capacity for rational thinking, Simon continues]...the first consequence of the principle of bounded rationality is that the intended rationality of an actor requires him to construct a simplified model of the real situation in order to deal with it. He behaves rationally with respect to this model, and such behavior is not even approximately optimal with respect to the real world. To predict his behavior, we must understand the way in which this simplified model is constructed, and its construction will certainly be related to his psychological properties as a perceiving, thinking, and learning animal. (Simon, H.A. The Sciences of the Artifical. Cambridge, Mass.: MIT Press, 1969.)

Thus, an understanding of how teachers cognitively construct the reality of teaching and learning remains central to the achievement of NIE's overall goal of developing the means to improve the provision, maintenance, and utilization of high quality teaching personnel. A teacher may possess the full range of relevant instructional skills, but if he is unable to diagnose situations in which a particular set of those skills is needed, the skills alone will be insufficient. Similarly, intelligent application of the methods of behavior analysis and modification is contingent upon accurate perceptions of student behavior, and upon warranted judgments and interpretations of its meaning. Recommendation of new personnel roles for teachers, or new patterns of staffing and differentiation of responsibilities must be consistent with information-processing capacities, beliefs, and motives of teachers; or at least with the likelihood of promoting the necessary cognitive characteristics through education and training. These are but a few examples of how a better understanding of the teacher's mental life contributes to the achievement of goals directly addressed by other panels at this conference.

In this Panel report, there is a commitment to understanding the ways in which teachers cope with the demands of classroom life, the circumstances in which these copings lead to successful teaching and learning, and the conditions under which they become maladaptive. There is a commitment to view the teacher as agent, rather than as a passive employer of teaching skills or techniques, a marginal operator in a complex system of technology, or a set of personality traits and aptitude measures. There is an orientation toward the teacher as clinician, not only in the sense of someone diagnosing specific forms of learning dysfunction or pathology and prescribing particular remedies, but more broadly as an individual responsible for aggregating and making sense out of an incredible diversity of information sources about individual students and the class collectively; bringing to bear a growing body of empirical and theoretical work constituting the research literature of education; somehow combining all that information with the teacher's own expectations, attitudes, beliefs, purposes; and having to respond, make judgments, render decisions, reflect and regroup to begin again. The actual ratio of reflection to reflex in teaching is itself an important subject for study, both in terms of how teaching currently occurs and in terms of the potential limits of change. Similarly, one must study the degree of flexibility one ought to expect from teachers in shifting from one mode of coping to another, or from a set of expectations once developed regarding a group of youngsters, to a modified and more warranted set.

With regard to method, the Panel respected the teacher's own self reports as an important (though typically not sufficient) source of data. Whether treated as the ubiquitous informant of anthropological inquiry, or the introspective problem-solver of information-processing research, or the interviewed (or questionnaired) holder of attitudes and beliefs of the social pyschologist, the panelists take seriously the value of the teacher's own description of how he or she constructs the reality of the classroom, of what was done and why, of who the students are and how he or she feels about them.

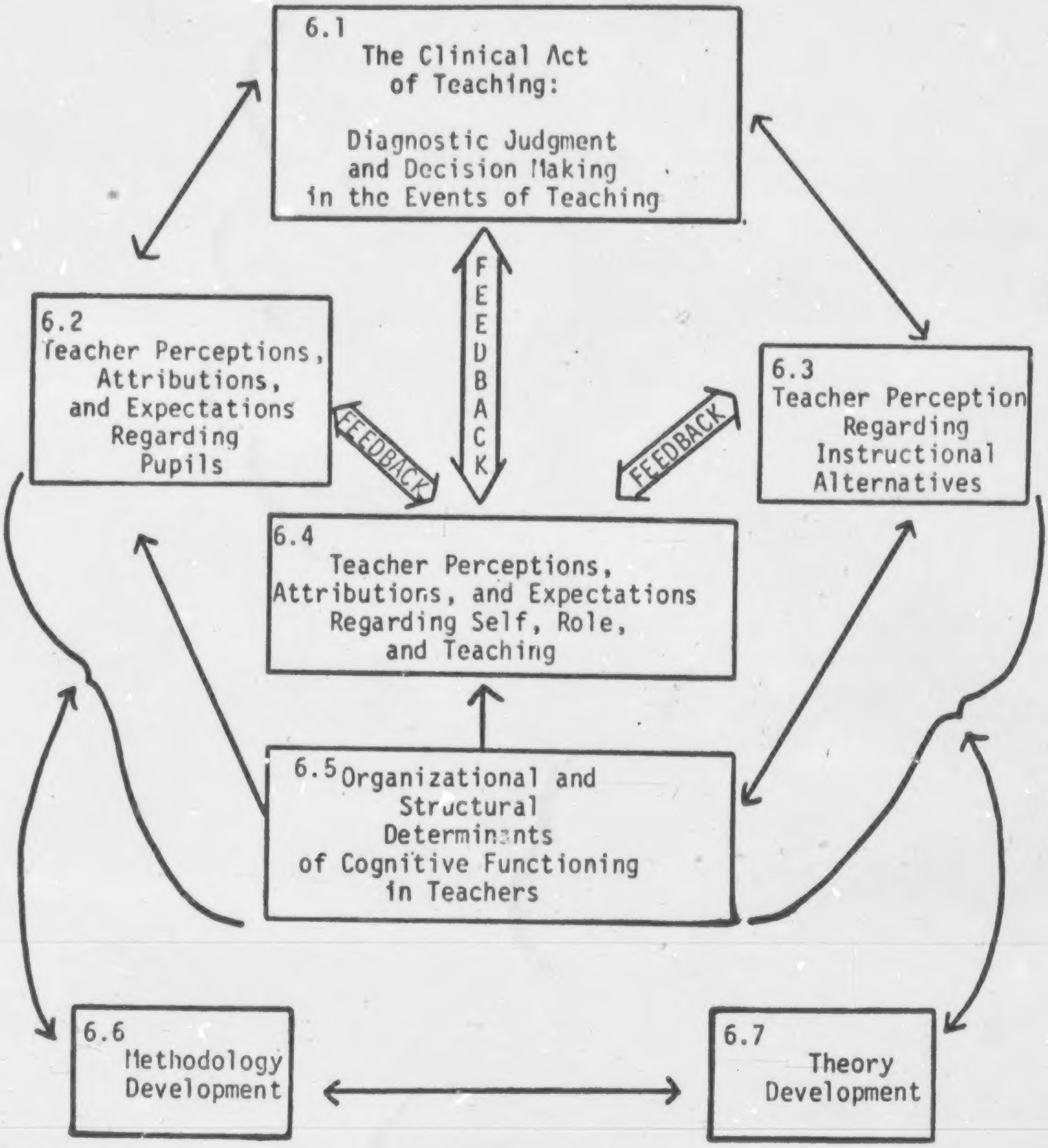
There is a combination of concern for the human problems of teaching and being a teacher and a commitment to whatever forms of disciplined inquiry seem appropriate to the research problem and educational setting under investigation. The Panel represented as wide a set of methodological orientations as one is likely to find in any single panel: anthropological observations in natural settings; mixtures of anthropological and social-psychological observations and codings of behavior in natural settings; experimental psychological investigations; mathematical modelling of behavior and information processing; clinical interviewing; and use of contrived non-natural settings via simulation or micro-teaching.

The Panel also employed a variety of theoretical stances that translate into contrasting metaphors for looking at "the teacher as ..." -- the teacher as diagnostician, as labeller, as self-fulfilling prophet, as decision-maker, as explainer, as attributor, and many more.

Finally, Panel participants did not perceive their work as having relevance only to educational settings organized around the way schools are typically found today. Whether education proceeds according to IPI, CMI, PLAN, or Mastery Learning; whether it goes on in pre-schools, free schools, or no schools; as long as a human teacher plays a central role in making the process work, an understanding of how that teacher thinks and how that thinking can be helped to function more effectively will remain a priority item for any agenda of research on teaching.

The focal point of all research programs in this problem area remains cognitive functioning, or the mental life of the teacher. The five substantive research approaches (leaving out for the moment the method and theory development approaches) define contrasting families of problems or topics for study. All relate to the basic questions: (a) How do the ways teachers think--about themselves, their work, their students, their subject matters and materials, the settings in which they operate and the alternatives which they consider--affect the nature and quality of their teaching and students' learning? (b) What are the ways in which the quality of these cognitive processes can be enhanced, whether through teacher selection, teacher preparation (in-service or pre-service), restructuring of schooling, development of teaching aids (technological, human or both) or some combination of these?

The representation of the research approaches and their interrelationships is found in Figure 1.


6.1
The Clinical Act of Teaching:
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Organizational and Structural Determinants of Cognitive Functioning in Teachers
6.6
Methodology Development
6.7
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FEEDBACK
FEEDBACK
FEEDBACK

Figure 1.

Approaches to the Study of Teaching as Clinical Information Processing.

Approach 6.1 - The Clinical Act of Teaching: Diagnostic Judgment and Decision-Making in the Events of Teaching. Central to this problem area is the view of the teacher as a clinician, actively processing information from many sources in order to render judgments and make decisions. These activities take place both in the "empty classroom"--the preactive phases of teaching, and in the real-time transactions between teacher and students--the interactive phases. In this clinical model of teaching, the teacher is seen performing a professional role quite parallel to those of physicians, lawyers, stockbrokers, military strategists (William James likened teaching to waging war), and other practitioners. The model focuses the researcher's attention on the manner in which teachers process information. They employ that information to reach diagnostic judgments and to make prescriptive decisions as they attempt to respond appropriately to each student's learning difficulties and strengths. Because the activities surrounding teaching as diagnostic problem-solving and prescriptive decision-making form the core of research in this area, this Approach is considered first and includes the largest number of currently defined research programs.

Approach 6.2 - Perceptions, Attributions and Expectations. Whereas diagnostic teaching per se revolves around specific instructional encounters and situations, there are other kinds of judgments teachers typically make which are more global, general or ascriptive. Such judgments ("bright," "smart-aleck," "lucky," "street blood," "school blood," "promising") may constitute an inference about the causes of student behavior, may concern a characterization of the pupil's general personality, or may be an implicit estimate of the likelihood of his future success. The judgments may be directed at specific students, or generalized across groups of students. Programs of research directed at understanding these judgments--how they are formed and what consequences they hold for teaching and learning--form Approach 6.2. Clearly, a teacher's general assessment of a pupil's characteristics and the teacher's diagnostic/prescriptive responses to that pupil's specific learning performance will interact in potentially significant ways. Thus, a particular research project might well cut across objectives in two research approaches.

*Approach 6.3 - Cognitive Processes in Selecting Among Instructional and Organizational Alternatives.* In addition to making global judgments about pupils, teachers also make general assessments about the organization of classrooms (and themselves) for learning. Teachers have perceptions and make judgments regarding grouping of students, arrangement of physical settings, instructional materials and methods, topics and objectives, which are of a different order from their perceptions of pupils, but which affect their diagnostic decisions regarding individual pupils and groups of pupils. These perceptions and judgments relate to the teaching of some*thing*, some*where*, some*time*, or some*how*--rather than teaching some*body*. Research on the antecedents and consequences of these types of teacher thinking constitutes Approach 6.3.

*Approach 6.4 - Teacher Perceptions of Self, Role and Teaching: Reflection and Feedback.* The next approach focuses upon the teacher himself, both as a holder of general beliefs, attitudes, motives and commitments toward a variety of individuals, objects and institutions; and the teacher as an object of his own cognitions--aware of himself, his behavior and motives, and capable of modifying his thoughts and actions on the basis of feedback and reflection. Approach 6.4 deals with this highly important area, in which may lie some of the keys to continuous teacher self-renewal and revised perceptions of pupils and instructional tactics.

*Approach 6.5 - Organizational and Structural Determinants of Cognitive Functioning in Teachers.* The mental life of teachers, whether occupied with thoughts of teaching acts (6.1), learner characteristics (6.2), organizing and planning for teaching (6.3), or reflecting on oneself and one's own functioning (6.4), does not occur in a vacuum. Indeed, teachers' thinking takes place in a matrix of organizational and structural circumstances. This matrix includes variations, such as open classroom vs. traditional setting, individualized teaching system vs. grouped system, graded vs. ungraded, self-contained vs. individualized, 15 pupils vs. 40 pupils, team teac[illegible] vs. individually managed classrooms, differentiated staffing [illegible]. traditional staffing, etc. These variations doutbtless affect the cognitive functioning of teachers. The programs of research in Approach 6.5 address the effects of such variables on the mental life of the teacher. Such organizational or technological changes will not only influence how teachers think and what they think about, but they must also be consistent with the realities of how teachers think and feel. Thus, for example, many millions of dollars worth of biomedical computing systems--hardware and software--are lying underused, if used at all, in hospitals and major medical centers across the country, because no one bothered to investigate the ways physicians and other health personnel really thought about and did their work. The systems introduced may have reflected the latest 'state-of-the-art' view of how computers ought to perform. Unfortunately, those who introduced these systems ignored the cognitive and attitudinal realities of the prospective users. We should avoid a similar fate in attempts to reform teaching.

The last two approaches do not characterize specific substantive thrusts within the problem area. Rather, they cut across topical concerns, and deal with problems of method and theory common to all approaches or necessary for relating approaches coherently with one another.

Approach 6.6 - Development of Research Methods. Much of the research described in the previous approaches differs in emphasis and theoretical orientation from both the neo-behaviorist experimental tradition and the psychometric tradition that have formed the mainstreams of American educational research. Therefore, neither the experimental design models of Campbell and Stanley (and their many inventive variants), nor the classical methods of measurement are sufficient in themselves for research in these areas. Approach 6.6 describes a program of research aimed at refining and improving methods of systematic introspection or thinking aloud; decision analysis; anthropological studies of teaching, analysis and coding of complex descriptive protocols; and the like.

Approach 6.7 - Theory Development. It was apparent during the Panel discussions that progress was made most easily when clear theoretical formulations were either available or could be readily produced. In the absence of theory, constructs refused to stay put, distinctions blurred and discussions were repeated endlessly. These are problems which will not be solved by more programs of empirical research alone. There is need to pursue serious efforts in theory development in this field, through support of individual theoreticians attempting to formulate pieces of the domain, groups of investigators attempting theoretical rapprochements across formulations, or short-term conferences to bring together representatives of theoretical positions that would otherwise be unlikely to communicate. In some ways, the Panel's discussions were representative of this third approach. Such an effort is of particular importance in this problem area, since so many types of theory are already brought to bear on cognitive functioning of teachers, yet each is but a partial theory when compared to the full span of cognitive functioning in which teachers engage. The recommendations of Panel 10 on Theory Development contain several suggestions which would be quite fruitfully pursued within the problem area of teaching as clinical information processing.

For purposes of this Panel's deliberations, a research program was defined as a stream of inquiry--a linked set of questions which follows a general conceptual model with respect to any given topic of investigation. That is, whatever approach to research on clinical information processing in teachers is being pursued, and whatever emphasis within that approach has been identified, there are certain general questions which the NIE ought to consider relevant, and which together constitute a research program. These five general orienting questions are:

1. What are the varieties of circumstances under which the topic under investigation occurs, is implicated, or might conceivably be involved? What are its characteristics? In planning research on teachers' causal ascriptions for pupil behaviors, the question would be phrased: "What are the circumstances under which causal ascriptions are made by teachers,and what forms do they take?" This question is abbreviated in the program description tables as What.

2. What are the antecedents or determinants of the events or process in question? Why do they occur? In the specific example used above, this line of questioning would ask: "Why are such causal ascriptions made? What are the situational and internal antecedents of causal ascriptions in teachers?" This question is abbreviated Why.

3. How can these processes be modified? This question essentially asks: Given an understanding of the antecedents of processes or events, how can these antecedents be manipulated or influenced in order to bring about change? In our specific example, it would be "How can we influence the causes of causal ascription or the attributional process itself?" This question is abbreviated How.

4. What consequences for teaching and learning flow from these processes or events? For example, "What effects on teaching or learning are discernible as a function of differences in patterns of teacher ascriptions of cause?" This question is So What.

5. What are the implications of the findings of studies of modifiability for the practical improvement of practice--programs of teacher selection or preparation, changes in the organization or methods of schoolings, and the like? These questions of feasibility of translating the results of research into realities of practice are referred to as Now What.

The five orienting questions can be asked with respect to each of the five substantive research approaches presented earlier. They are less clearly relevant to the method and theory development approaches. Each of the specific program descriptions presented in the complete document takes its research topic and acquires its programmatic quality as a stream of inquiry through the five orienting questions. Thus, any given program of research becomes a set of possible linkages, and does not necessarily describe the required scope of any individual research project. In fact, it is unlikely that any specific project will carry through an entire stream of inquiry. But, it is because NIE recognizes the linkages that it can stimulate the pursuit of linked inquiries, even though conducted by independent investigators.

## LIST OF APPROACHES AND ILLUSTRATIVE PROGRAMS

1. The Clinical Act of Teaching 6.1
   - a. Analyze the Diagnostic Process 6.1.1
   - b. Examine the Pervasiveness of Bias in the Diagnostic Inference 6.1.2
   - c. Examine Teachers' Diagnoses in the Preactive Phase of Teaching 6.1.3
   - d. Examine Teachers' Diagnoses in the Interactive Phase of Teaching 6.1.4
   - e. Examine Diagnostic Teaching in the Subject Area of Reading (other subject areas would require parallel lines of research). 6.1.5
   - f. Examine ways of Using Information about Students in Arriving at Instructional Judgments 6.1.6
2. Perceptions, Attributions and Expectations 6.2
   - a. Examine Teachers' Perceptions of Students 6.2.1
   - b. Assess the Consequences of Labelling on both Teacher Performance and Student Response 6.2.2
   - c. Examine Causal Ascriptions and the Educational Process 6.2.3
   - d. Examine Teacher Expectations of Class Performance Level and Their Antecedents and Consequences 6.2.4
3. Cognitive Processes in Selecting Among Instructional Alternatives 6.3
   - a. Examine Classroom Grouping Practices as Influenced by Teacher Cognitive Processes 6.3.1
   - b. Examine Individualization of Instruction Especially in Terms of Conflict between Diagnosis and Discrimination 6.3.2

4. Teacher Perceptions of Self, Role, and Teaching 6.4
    a. Develop the Means to Improve the Self-Awareness of Teachers 6.4.1
    b. Examine the Cognitive Determinants of Teacher Motivation 6.4.2
5. Organizational and Structural Determinants 6.5
    a. Examine the Effects of School and Classroom Organization on the Development and Stability of Teacher Expectations: Team Teaching 6.5.1
    b. Examine Pupil Record-Keeping Systems as Determinants of Teachers' Thinking about Pupils, Programs and Instructional Alternatives 6.5.2
6. Research Method Development 6.6
    a. Carry Out General Studies of Methods 6.6.1
7. Theory Development

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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 7 SUMMARY

## INSTRUCTIONAL PERSONNEL UTILIZATION

### GOAL STATEMENT

To generate scientific knowledge on how the organizational, administrative, physical, personal, and social aspects of the classroom, school, district, and community support instructional personnel in reaching educational goals.

### PARTICIPANTS

Dr. Robert Egbert, Chairperson
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Dr. Richard Schmuck
*Dr. Barbara Sizemore
Ms. Linda Douglas, Secretary

*was invited but was not able to take part in the conference.

| Locus<br>Variables | Inside School | Outside School |
|---|---|---|
| Organizational/Administrative | Approach 7.1 | Approach 7.2 |
| Physical | Approach 7.3 |  |
| Personal/Social | Approach 7.4 | Approach 7.5 |

## SUMMARY

The Panel on Instructional Personnel Utilization organized its research programs under five Approaches:

1. Generate scientific knowledge on how the organizational and administrative aspects of the classroom and school support instructional personnel in reaching educational goals.

2. Generate scientific knowledge on how the organizational and administrative aspects of the district and community support instructional personnel in reaching educational goals.

3. Generate scientific knowledge on how the physical aspects of the classroom and school support instructional personnel in reaching educational goals.

4. Generate scientific knowledge on how the personal and social aspects of the classroom and school support instructional personnel in reaching educational goals.

5. Generate scientific knowledge on how the personal and social aspects of the district and community support instructional personnel in reaching instructional goals.

## DISCUSSION

Early in the conference, members of Panel 7 expressed doubt that it is possible to carry out straightline planning toward particular goals and objectives in a field such as educational research which lacks an extensive, organized knowledge base. Questions have been raised about this kind of a planning process in cancer research; yet such a procedure is a hundredfold more questionable in a field like education and in particular, in an area like teacher utilization where there is not yet a scientific and successful paradigm for research. Indeed, within the teacher utilization area, there is very little research and certainly not enough to form a systems model.

There was significant agreement among Panel 7 members that much of the earlier work on teacher utilization had a manipulative quality, as if teachers were uninformed, poorly motivated employees with whom a firm hand was advisable. Panel 7 deliberately structured its programs to reflect a change in underlying values with respect to forming goals for research relevant to teachers, a change which recognizes the responsible, professional status and performance of teachers and other school personnel.

There was consensus that dependent variables other than simply "pupil outcomes" should be considered in the area of teacher utilization. Such issues as the nature of the teacher's interaction with pupils and other teachers and the nature of the teacher's planning behavior should be considered as dependent variables.

The original problem area statement contained in the pre-conference outline focused the initial work of the panel:

> Develop the means to improve the ways in which teacher and other educational personnel are utilized in the organizational, administrative, and physical environment of the classroom, school, and community.

The panel discussed a number of the points embodied in this statement and agreed upon the following modifications:

- The phrase "develop the means" was changed to "generate scientific knowledge." This modification was made to reflect the research-based nature of the panel's task.

- It was agreed that the scope of the problem area included classroom teachers, other people in the classroom, principals, and specialists, but did not include secretarial and clerical personnel, maintenance staff, lunchroom staff, or bus drivers unless such persons were judged to interact with students in an instructional manner.

- The personal and social aspects of the problem area were added to the goal statement.

- The impact of the school district setting was identified as being a part of the physical environment.

A matrix was developed (see Figure 1) to contain and display the five Approaches developed by the Panel, using the two dimensions of "Locus" (Within School and Outside School) and School Variables (Organizational/Administrative, Physical and Personal/Social).

| Locus<br>Variables | Inside School | Outside School |
|---|---|---|
| Organizational/Administrative | 7.1 | 7.2 |
| Physical | 7.3 | |
| Personal/Social | 7.4 | 7.5 |

Figure 1

Matrix of Approaches

### Approach 7.1 - Generate scientific knowledge on how the organizational and administrative aspects of the classroom and school support instructional personnel in reaching educational goals.

Today's teacher is being asked to do a far more difficult task than ever before. Society no longer tolerates failure and early school-leaving as an acceptable outcome for a large proportion of students. The techniques of teaching have been greatly complicated by the introduction of a variety of materials and media. No longer is it satisfactory to parents and professionals for teachers to use a combination of lecture and recitation based on a single text per subject area. Content and processes must somehow be "individualized" so as to maximize learning. The progress of individuals and the planning for their activities must be monitored and coordinated; the teacher has become a classroom director, aside from his other roles.

Recent research reveals a high level of innovation in the areas of school organization and educational technology. But such innovations are frequently dropped, leading to a general cynicism about the possibility of a pay-off in terms of student achievement. Some of these innovations are felt to show great promise, but the school staff is unable to solve the problems they entail and thus get them coordinated into the classroom and the school. In order for these innovations in the technology of teaching to result in desired student outcomes, the administration and organization of the school must undergo certain changes. In addition, staffing and organization patterns must provide greater support for the classroom teacher. Such personnel innovations as team teaching, differentiated staffing, and additional specialized personnel have been designed in part to provide additional support to the classroom teacher. However, each of these changes in turn implies a series of role changes and the necessity for new and different skills on the part of classroom teachers. Successful implementation of innovations requires not only the organizational support for new teacher roles, but administrative support in terms of resources, encouragement, planning time, and the like.

This Approach hypothesizes that the persistent organizational failure to support the classroom teacher is a prime cause of (a) the rapid disappearance of once-promising instructional innovations and (b) the failure of these innovations to result in improved student achievement.

The objective of this Approach and its programs is to change organizational and administrative arrangements in such a way as to reduce the isolation of the classroom teacher, and to provide more supervisory and expert time and resources while at the same time delegating certain aspects of the teacher's role to aides or volunteers. By redirecting personnel toward the central objective of instruction, it should be possible to take full advantage of improved technology in producing desired student outcomes.

Underlying this approach are several assumptions concerning effective work organizations. One is that the structure of an organization must change as the technology changes so as to assist in carrying out the new tasks. A second assumption is that changes in technology and organization must be accompanied by the clear understanding of the expectations of the new roles, and by the acquisition of new skills relevant to the interaction required of new roles. A third assumption is that school personnel must acquire the capability to learn through experimentation over time how to solve the problems generated by innovation in both structure and technology.

Approach 7.2 - Generate scientific knowledge on how the organizational and administrative aspects of the district and community support instructional personnel in reaching educational goals.

This Approach is concerned with ways in which formal organizational and administrative aspects of environments (district and community) external to the local school affect ways in which classroom personnel are utilized in their jobs and supported for the improvement of instruction.

A summary of the background and current knowledge about this Approach must be divided into two fairly different (but often overlapping) traditions. One has to do with those formal managerial arrangements of the school district that relate to the effective utilization of teachers. The second concerns community dynamics and how these affect the ways in which classroom personnel are supported or not supported in attempts to improve classroom instruction.

It should be possible to generate many hypotheses linking community processes to the utilization and improvement of teaching. For instance, hypotheses should be generated on how to use non-professionals from the local community to change current teacher utilization patterns, on how to confront and handle in a rational fashion organized protests against the school, and on how to relate the "community school organization" to increased support or nonsupport of teachers. This subapproach has great promise; yet present knowledge in this area is very limited.

Therefore, the specific purpose of this Approach will be to generate scientific knowledge and practical procedures for increasing mutual influence between district personnel and teachers (on the one hand), and between citizens in the local community and teachers (on the other hand) to improve the utilization and performance of instructional personnel within schools.

Some assumptions that grow out of this orientation and that underlie the research in this approach are:

1. Although the importance of human interaction often is overlooked by educators (and other citizens),

it is people who represent the primary resources entering, being processed and utilized by, and leaving the school.

2. It is the quality of the group interaction processes intervening between the incoming "people-resources" and the outgoing "people products" that will determine the school's instructional performance.

3. Because schools are open systems, interpersonal interactions at the "organizational interface" influence ways in which the "people-resources" are utilized and supported.

4. A key perspective for studying such interactions as the "organizational interface" (e.g., "district personnel-school personnel" and "community participants-school personnel") is to view them as interpersonal transactions involving social influence processes.

5. Different bases of social influence characterize their interactions and will affect educational output differently.

6. Social influence in such interpersonal transactions is not usually inevitably a "zero-sum game"; i.e., increased supervisory influence need not lead to decreased teacher influence, and increased citizen influence need not lead to decreased teacher influence. As shown in 15 years of research at the Institute for Social Research at the University of Michigan, all parties in the organizational-influence interaction can gain at the same time in terms of shared and valued outcomes.

Approach 7.3 - Generate scientific knowledge on how the physical aspects of the classroom and school support instructional personnel in reaching educational goals.

Until recently, the facilities provided for formal learning activities were standardized and had remained relatively unchanged over a long period of time. So long as teaching was perceived as "telling," the only basic support requirement was rooms for lecturing. Suitable to this view, work stations for youndger learners were simply desks that provided a place at which to listen and to read and write, and which, for logistical purposes, could be permanently arranged in fixed rows. Room sizes were determined by the number of students a single teacher could conveniently instruct. Buildings for learning were collections of like-sized and interchangeable rooms. The only common variations on this arrangement have been provisions of a separate room for the collection of books (the library), a place for indoor exercise (the gym), and a place for large-group occcasions (the auditorium).

Research in the area tends to underscore the significance of environmental factors to staff functioning. However, there does not appear to be a great deal of activity by educational researchers dealing directly with the problem. Findings in the broader field of environmental psychology need to be translated for their specific meanings to education. Likewise, the field of sociology needs to be explored for its obvious contributions to the problem.

Therefore, the objective of this Approach is to generate a coordinated series of studies which will document the cause and effect relationships between physical environment in the school and classroom and the functioning of instructional staff.

The concepts or theories affecting this Approach will be drawn from the disciplines of psychology and sociology. Within the problem areas developed at the NIE conference, the most likely overlap is with work proposed by Panel 8 in relation to changing educational roles. If the premises of this Approach are valid, physical environment will have a strong influence on emerging role structure for teachers.

It has been assumed here that the way staff is used is a function of the physical environment. It is further assumed that, if program goals are to be reached, the physical environment must be one of the supportive factors which contribute to achievement of the goals. This being the case, it becomes necessary to establish not only the cause and effect relationships between staff functioning and the physical environment, but also the relative importance of the physical environment in the broad scheme of implementing the instructional program.

Approach 7.4 - Generate scientific knowledge on how the personal and social aspects of the classroom and school support instructional personnel in reaching educational goals.

Teaching is a very personal act in which the feelings, attitudes, beliefs, and values of the person doing the instructing have a most significant impact on how he/she functions as a teacher. Teaching is carried out by the instructor within a social context which affects how the teacher does his/her work. More specifically, the nature of the personal-social support which a teacher receives influences the following, each of which can be hypothesized to bear a relationship to the accomplishing of instructional goals by students: (a) the ways the teacher relates to students, (b) teachers' willingness and ability to create and innovate, (c) teachers' willingness to profit from staff development experiences and to implement instructional and program plans, (d) teacher job satisfaction, and (e) the energy teachers can devote to instruction.

Overall, past research in the area of this Approach has been spotty and not directly focused on identifying the nature of how the total personal-social support structure within which the teacher works assists or hinders him/her in reaching instructional goals. Considerable conventional wisdom exists in this area, but it has not been verified by carefully developed research. Personal-social support for the teacher would seem to be an essential condition for the success of other approaches aimed at assisting the teacher to become more effective in reaching instructional objectives.

The specific purposes of this Approach then become (a) to determine whether in fact such a relationship between personal-social support and teacher effectiveness does exist and, if so, (b) to identify ways to produce such personal-social support.

The emphasis in this Approach is basically on informal, primarily unofficial, at least partially unplanned types of personal-social support. One result of research in this area however might be to make the personal-social support structure of a school more formal, official, and planned.

Study in this area is closely related to the study of the personal-social support climate for teachers in the district and community and to certain aspects of the organizational pattern of the school as well as its physical structure.

Research in this area must be focused on identifying how the individual teacher, as well as a group of teachers, responds to the personal-social support system of the school. Differences among teachers are likely to be great, this being at least partially the result of differences in their self-reinforcing systems. If this research is to be useful to the school administrator, it must enable him/her to understand the personal-social support structure as experienced by teachers both as individuals and as a total staff.

The basic assumption underlying this Approach is that there is an important relationship between the personal-social support teachers receive and their effectiveness in reaching instructional objectives, particularly when the teacher believes himself/herself to be an important part of a significant undertaking.

Approach 7.5 - Generate scientific knowledge on how the personal and social aspects of the district and community support instructional personnel in reaching instructional goals.

There are potent social and personal influences in the life of a teacher which impinge upon that person's effectiveness as a member of a group of people whose job it is to "keep school " One way of categorizing these personal-social influences is to refer to those informal messages and social encounters (interactions) which occur within the context of the work-station to which a teacher is assigned in a particular school building and to those that occur within the school building itself. The Panel on Instructional Personnel Utilization has referred to these as the internal influences--those directly related to the day-to-day work context of the teacher. Included in this category are the informal interactions between children and teachers, teachers and principals, and teachers and teachers.

In addition to these internal influences are those that occur outside the specific context of the school, classroom, or area in which a teacher performs his/her duties. The Panel has referred to these as "External" influences. The external social-personal influences include those associated with (a) other teachers who perform their duties in other school buildings, (b) central office personnel who do not routinely come in personal-social contact with teachers, (c) parents and other community persons, (d) friends, (e) family, and (f) acquaintances. More formal influence may be exerted on the social-personal level through teachers' associations, unions, or other professional groups.

The Approach suggested herein is to develop a knowledge base concerning the latter set of "external, informal, social-personal" influences which in some measure limit, or free, the teacher with respect to how the teacher will utilize his/her skills or to how the teacher is willing to be assigned (deployed, made a member of a team, selected as a team leader, asked to work with "special" children, given developmental tasks such as writing new curricula, enlisted as a volunteer participant in special projects, and so on). The Panel recognizes that the social-personal influences to which we are referring may not have the most obvious and direct connection with our basic focus on teacher assignment and function. However, we cannot help but believe that pervasive messages are conveyed to teachers within this society which do influence their feelings about themselves, about their schooling, and about the limits of their discretionary powers as professionals; and that these feelings in turn affect their performance. These messages are conveyed in a myriad of informal ways--often unintentional, but nevertheless real. The messages affect motivation which in turn determines entrance into the teaching field, risk-taking and exploratory behavior once in the field, and exit from the field (of direct contact with children, and/or education in general).

The basic assumptions underlying this Approach are:

1. Expectancies (values) are communicated through social-personal systems external to a school.

2. Teachers are sensitive to these communications and derive estimates of their own status from them.

3. There is a positive correlation between status and motivation to improve.

4. The schools reflect the social power hierarchy of the community .

## LIST OF APPROACHES AND PROGRAMS

| | |
|---|---|
| 1. Generate Scientific Knowledge on How the Organizational and Administrative Aspects of the Classroom and School Support Instructional Personnel in Reaching Educational Goals. | 7.1 |
| a. Organization of Staff Resources for Continual School Problem-Solving | 7.1.1 |
| 1) An Experiment in Using Teacher Teams in Solving Problems at the School Level | 7.1.1.1 |
| b. Studies of Group Process Skills as Related to Staff Capability | 7.1.2 |
| c. Studies on Authority and Evaluation in Relation to Staff Ability to Carry Out Instructional Tasks | 7.1.3 |
| d. Relationship Between Various Types of Accountability and the Group and Individual Behavior of Teachers | 7.1.4 |
| e. Studies of the Socialization of Teachers into Various Administrative and Organizational Arrangements | 7.1.5 |
| f. Effects of Organizational and Administrative Arrangements on Teacher Initiative | 7.1.6 |
| g. Studies of the Career Patterns of Instructional Personnel | 7.1.7 |
| 2. Generate Scientific Knowledge on How the Organizational and Administrative Aspects of the District and Community Support Instructional Personnel in Reaching Educational Goals. | 7.2 |
| a. Consultative Activities Within the District for Continual School Problem-Solving | 7.2.1 |
| 1) A Study of the Advantages and Disadvantages of Two Sorts of Districtwide Structures for Delivering Group Process Consultation to Teaching Teams | 7.2.1.1 |
| b. External Influences on School District Instructional Goals, Policies and Processes that Affect School District Staff Assignment and Functioning | 7.2.2 |

c. Studies of the Effects of Community Participation in Relation to Staff Support for Instructional Programs 7.2.3

  i) A Study of the Effects of Several Types of Parent Participation on Instructional Personnel 7.2.3.1

3. Generate Scientific Knowledge on How the Physical Aspects of the Classroom and School Support Instructional Personnel in Reaching Educational Goals. 7.3

a. Studies of the Relationship of Physical Environment to Innovative Staffing and Instructional Strategies for Teaching 7.3.1
b. Relationship of the Use of Learning Resource Materials and Equipment to Staff Assignments and Functions 7.3.2
c. Relationship Between Aesthetic Quality of School Physical Environment and Staff Functioning and Morale 7.3.3
d. Relationship Between Standards which Districts Use in Selecting Equipment and Supplies to Quality of Instruction 7.3.4

4. Generate Scientific Knowledge on How the Personal and Social Aspects of the Classroom and School Support Instructional Personnel in Reaching Educational Goals. 7.4

a. Studies of Informal Rewards and Costs (Punishing Conditions) in Relation to Staff Functioning and Morale 7.4.1
b. Studies on Ways in which Informal Processes and Personal Characteristics Relate to Staff Assignments and Functioning 7.4.2

5. Generate Scientific Knowledge on How the Personal and Social Aspects of the District and Community Support Instructional Personnel in Reaching Instructional Goals. 7.5

a. The Effects of the Social Settings and Population Composition of a School Community on the Assignment and Functions of Teachers 7.5.1

  i) The Effect of Desegregation on Racial Composition of Teaching Staffs 7.5.1.1

ii) The Effect of Male Administrators on Teachers and the Socialization of Girls 7.5.1.2

iii) The Relationship Between the Low Status of the Teacher Aides and the Representation 7.5.1.3

iv) The Development of a Method for Treating Staff Interaction Problems When the Staff is Interracial 7.5.1.4

v) The Relationship Between Career Ladder Opportunities for Teacher Aides and Their Effectiveness in the School Setting 7.5.1.5

b. Studies of the Effects of the Status of Teachers as Communicated Through Informal Communications Outside a Particular School on the Assignment and Function of Teachers 7.5.2

i) The Analysis of Community Definitions of Teacher Responsibilities 7.5.2.1

ii) The Relationships of Different Community Settings to the Interpretation of Status Among Teaching Staffs 7.5.2.2

iii) The Relationship of Communications from Local Media to the Interpretation of Status Among Teaching Staffs 7.5.2.4

iv) The Development of Alternative Ways of Communicating Positive Status Indicators to Teaching Staff 7.5.2.5 7.5.2.5

v) The Development of Alternative Ways of Helping Teachers Identify Positive Messages Concerning Their Staffs 7.5.2.6

vi) The Development of Alternative Messages to the Community to Influence Community Definitions of Teacher Responsibilities 7.5.2.7

c. Varying Patterns of Informal Citizenry Influence on Schools and the Effect of their Values on Teacher Assignments and Functions 7.5.3

d. Community Mobility and its Effect on Teacher Assignments and Functions 7.5.4

e. The Effect of Student Progress Through the Educational System and Its Effect on Teacher Assignment and Function 7.5.5

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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 8 SUMMARY

## PERSONNEL ROLES IN NEW INSTRUCTIONAL SYSTEMS

### GOAL STATEMENT

To explore the functions and roles of all personnel involved in new instructional systems which bring to bear advances in learning research and instructional technology.

### PARTICIPANTS

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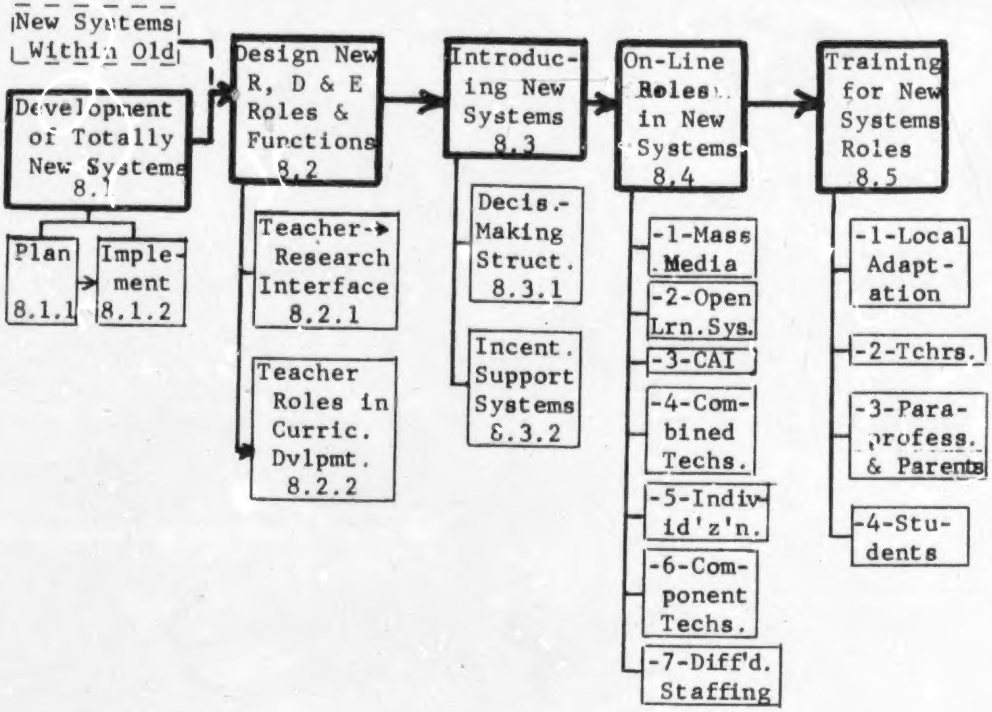
New Systems Within Old
Development of Totally New Systems 8.1
Plan 8.1.1
Implement 8.1.2
Design New R, D & E Roles & Functions 8.2
Teacher-Research Interface 8.2.1
Teacher Roles in Curric. Dvlpmt. 8.2.2
Introducing New Systems 8.3
Decis.-Making Struct. 8.3.1
Incent. Support Systems 8.3.2
On-Line Roles in New Systems 8.4
-1-Mass Media
-2-Open Lrn.Sys.
-3-CAI
-4-Combined Techs.
-5-Individ'z'n.
-6-Component Techs.
-7-Diff'd. Staffing
Training for New Systems Roles 8.5
-1-Local Adaptation
-2-Tchrs.
-3-Paraprofess. & Parents
-4-Students

## SUMMARY

The Panel on Personnel Roles in New Instructional Systems organized its programs and projects under the following approaches:

1. Investigate the characteristics and effects of totally new instructional systems.
2. Investigate the personnel functions and roles necessary for development, evaluation and research on new instructional systems.
3. Investigate the personnel functions and roles necessary for the selection, adoption, implementation and continuation of new instructional systems.
4. Investigate the instructional functions which are integrally involved in operating new instructional systems.
5. Investigate the ways in which persons can be prepared for new roles and functions.

## DISCUSSION

An implicit assumption in the Panel's deliberations is that change will come to the school system and that it will represent a systematic development; namely, a systems approach.

The systems approach begins, not with the teacher-in-a-classroom as a given, but with an analysis of the goals which the system should achieve as its "output". The output is the educated person. Working from the output to the requirements necessary to achieve such an output has generated fair consensus on certain attributes a well-designed system will have. These attributes include individualization of treatment responsive to student needs and goals, intensive capitalization in terms of high quality materials and validated procedures, and adequate staffing to perform the required functions. It is generally agreed that the present "system" does not exemplify good design along these lines.

The introduction of change may involve the creation of totally new systems, an approach in which an attractive alternative to the existing system is offered as a model, inspiring other systems to follow its lead. Or, it may involve significant revision of an ongoing "conventional" system, with a period of adjustment as old changes to new.

Approach 8.1 involves investigating the characteristics and effects of personnel roles in the totally new educational systems. In order to insure new systems instead of adaptations of existing traditional ones, it is intended that they be established with deliberate disregard for political, social and other constraints. Such an approach is intended to yield new ideas as to how to develop educational innovation at the total-system level. Two programs are subsumed under this Approach: the first is a systematic planning of all aspects of an integrated, comprehensive instructional system which would not be bent to conform with policies, procedures and pressures inherited from existing school arrangements. Planning activities would include the establishment of goals, themes, policies, organization, personnel functions, costs and scheduling of such systems. If the bold new design appeared feasible, the second program would implement it. A major aspect of the implementation program would be an evaluation of its performance in the achievement of stated educational goals.

Whether system design results in a model built outside the present educational system or in drastic changes within present schools, the development of new instructional systems requires new personnel trained in instructional technology as an applied science. The development of such personnel capabilities for research, development, and evaluation technologies constitutes Approach 8.2. Among programs considered under this Approach were several concerned with fostering an interaction between personnel developing such new systems and personnel in existing systems. The intent is to improve the channels for input into the research and development process from present instructional personnel, and to increase the possible disseminability of the resulting research products. In addition to such a needs-focusing role, the potential role of experienced teachers in the further development process was seen as a further area for experiment and study.

Approach 8.3 is concerned with the structures and strategies by which innovative systems could eventually stabilize into full realization of their potential value for improvement. In order to break the common historical cycle of initial enthusiasm, hard work on the innovation, and eventual return to normal, the Panel felt the need for a more solid base of knowledge on (a) decision-making structures which encourage or inhibit innovation and change, (b) dissemination strategies, including demonstrations and the distribution of information about potential innovations, (c) ways of building in acceptability of the new system in terms of the alternative roles designed into it for existing personnel, and (d) installation strategies which take account of the full range of operative factors in the natural setting. Such knowledge can be built up both through the study of existing systems, such as the analysis of existing federal and state regulations in terms of their influence in facilitating or retarding change, and through the development of new models for systems change. Programs generated by the Panel in this area include a program to analyze and model new decision-making structures for adoption and implementation of innovative systems, and a program aimed toward the development of a comprehensive incentive and support system which could effectuate the continued active interest and personnel participation in innovative instructional systems.

While Approach 8.3 deals with the roles involved in the adoption and maintenance of new instructional systems, Approach 8.4 is concerned with delineation of roles necessary to the on-going operation of a smoothly installed new system. Looking into the future, systems involving mass media, computer-assisted instruction, and integrated multi-media systems as well as mostly print-based individualized systems are foreseen. The use of broadcast media introduces roles relatively new to education whose function and effect should be studied prior to large scale investment in the production of training materials. New personnel roles involved in open learning situations should be studied in the context of the success of the system and its ability to survive. Computer assisted instruction introduces new personnel requirements and support functions which are significantly different from those in existing systems. There is a marked need for empirical testing of several different conceptions of CAI manpower with standard types of hardware, curriculum and pedagogy. Knowledge concerning the present status of differentiated staffing with regard to impact on students will help develop a model for building future staffing patterns that reward skilled teachers, help in individualization of instruction and provide for shared decision making. Combinations of the above roles, as well as others, in a single instructional system are also possible and worthy of investigation.

Approach 8.5 suggests a series of programs aimed at locating or developing training procedures for roles in emerging instructional systems. Where such skills already exist, incentive systems to encourage their use, as in Approach 8.3, would be sufficient. Where such skills do not exist, pre-service and in-service training is required. Among the latter skills are those required in the local adoption of relatively well-developed systems (of which a few exist), and in management of new systems at the school-wide level (the principal's role) or the student interface level (the role of the teacher and supporting personnel). Other personnel for whom training needs are identified include paraprofessional staff and even students themselves as they move to more active participation in the planning and management of their own education.

## LIST OF APPROACHES AND PROGRAMS

1. Investigate the Characteristics and Effects of Personnel Roles and Functions in Model New Instructional Systems Which Are Set Up in Isolation From the Usual Constraints Imposed on Innovations Within Existing Systems and Schooling, or Are Used to Replace Existing Systems. 8.1
    - a. Develop plans for totally new instructional systems. 8.1.1
    - b. Implement one or more totally new instructional systems. 8.1.2
2. Investigate the Personnel Functions and Roles Necessary for the Research, Development, and Evaluation of New Instructional Systems. 8.2
    - a. Develop and evaluate the feasibility of establishing a formal institutional component serving school districts, with the purpose of obtaining teacher inputs into the identification of R&D problems. 8.2.1
        - i) Develop a rational model of operation for obtaining teacher contributions to identification of R&D problems, and describe key staff positions entailing such responsibilities. 8.2.1.1
        - ii) Investigate arrangements for obtaining teacher contributions to identification of R&D problems in a large school district, matched with a comparable project for establishing cooperative arrangements in small districts. 8.2.1.2
        - iii) Develop a formal needs assessment instrument to enable teachers to systematically feed into the system their felt needs. 8.2.1.3
    - b. Develop and evaluate various models for utilizing the participation of experienced teachers with instructional development teams in formulating and developing new instructional materials. 8.2.2

3. Investigate the Personnel Functions and Roles Necessary for the Selection, Adoption, Implementation, and Continuation of New Instructional Systems. 8.3

    a. Analyze and propose new decision-making structure and interrelationships among personnel necessary for the adoption, implementation, and modification of innovation systems in a school or school system in response to local needs. 8.3.1

        i) Set up a model decision-making structure for implementing a new instructional system, analyze personnel roles performed within that structure, and prepare materials for training appropriate persons to perform those roles. 8.3.1.1.

    b. Investigate the use of incentives and other support systems designed to increase the acceptance and continuation of new instructional systems. 8.3.2

4. Investigate Operating Instructional Functions and Roles Which Are Integral to New Instructional Systems. 8.4

    a. Investigate the roles and functions that are necessary for instruction involving mass (broadcast) media. 8.4.1

    b. Investigate the roles and functions necessary for instruction in open learning systems. 8.4.2

    c. Investigate roles and functions necessary for incorporating computer-assisted instruction. 8.4.3

    d. Investigate the roles and functions that are necessary for educational settings which use combined instructional components. 8.4.4

    e. Investigate the roles and functions that are necessary for instruction using individualized materials based systems (e.g., IPI, IGE, etc.). 8.4.5

        i) Develop and evaluate a classroom-managed system of peer tutoring in grades 4-7, with specification of the functions of teacher and students and an evaluation of effectiveness. 8.4.5.1

    f. Develop and evaluate novel component techniques involved in the roles of instructional management, presentation, (local) design, and evaluation. 8.4.6

    g. Survey differentiated staffing projects and develop models of differentiated staffing. 8.4.7

5. Investigate the Ways in Which Persons Can and Should Be Prepared for New Roles and Functions. 8.5

    a. Develop methods of training for local adaptation of new instructional systems. 8.5.1

    b. Develop and evaluate alternative models of teacher training for roles and functions emerging from new instructional systems. 8.5.2

        i) Develop a self-instructional curriculum for off-campus use for college credit to acquaint principals with the philosophy, techniques, and implementation problems of continuous progress systems. 8.5.2.1

        ii) Analyze common attributes of new instructional systems and develop training materials for the training of educational personnel. 8.5.2.2

        iii) Survey Teachers' Centers. 8.5.2.3

    c. Develop methods for training paraprofessionals and parents on the instructional functions and roles that are integral to new instructional systems. 8.5.3

    d. Develop means by which students at any age level can be taught to perform main-line diagnostic, managerial, tutorial, instructional and evalative functions for themselves and others in an adaptive instructional setting. 8.5.4

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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 9

## RESEARCH METHODOLOGY

### GOAL STATEMENT

To improve the validity and utility of measurement, design and analysis in research on teaching both through the stimulation of new methodological knowledge as well as through the identification and translation of useful existing knowledge from other disciplines.

### PARTICIPANTS

Dr. Andrew Porter, Chairperson
Dr. T. Anne Cleary
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Ms. Linda Glendening, Secretary

## SUMMARY

The Research Methodology Panel identified four general approaches for achieving its stated goal:

1. Develop and test new analysis and design strategies appropriate for research on teaching.
2. Increase understanding of existing measurement strategies for research on teaching and, where appropriate, develop new measurement strategies.
3. Identify, demonstrate and disseminate methodologies from other research disciplines which appear to have merit for research on teaching.
4. Consider the utility of standards for improving methodological practice in research on teaching.

## DISCUSSION

Although much useful research on teaching has been conducted, the utility of some of the research has been limited because of methodological problems. In some cases, appropriate methodology was not available; in other cases, established best practices were not followed. In addition, there have been cases where methodologies were borrowed from other research disciplines without a careful rethinking of the assumptions involved.

Thus, the intent of the Panel was to identify as many methodological problems as possible which limit the productivity of research on teaching. Because of the breadth of the area considered, the time constraints, and the limited number of people involved, it is likely that important problems were omitted. Even those problems identified were described with varying degrees of specificity. It is hoped, therefore, that this document will stimulate productive written criticism as to the relevance of problems identified, the adequacy of the descriptions of those problems,and important problems that were omitted.

The four Approaches that were adopted were believed to encompass all the methodological problems of research on teaching and are, therefore, necessarily broad in nature. The first two Approaches emphasize the need for new methodological developments which specifically address the needs of research on teaching. These two Approaches consider problems of design and analysis (9.1) and measurement (9.2) respectively and, taken together, cover the full range of new methodological developments. The third Approach (9.3) recognizes that there are existing methodologies developed in other research disciplines that may have relevance to research on teaching, but which are as yet untried in that context. The final Approach (9.4) is in response to the criticism that some of the research on teaching suffers from a failure to use the best existing methodological practices. It was suggested to the Panel that a statement on standards of methodological practice for research on teaching would be useful in alleviating that problem.

## Approach 9.1 - Develop and Test New Analysis and Design Strategies Appropriate for Research on Teaching

The development of principles for the design and analysis of studies has a long history, much of it stimulated by problems of research in specific fields. For example, during the early and mid-twentieth century, problems of analysis of agricultural data played an important role in the development of techniques commonly used today. Even today, we see many new developments coming from areas other than education. For example, response surface methodology has come primarily from industrial and engineering problems. Generally, there has been less input to this literature from education and teaching than from agriculture, the biological sciences, etc.

Perhaps the major impression left by reviews of current research on teaching is that problems of design and analysis are encountered at many stages, and are solved, if at all, in an imitative or derivative fashion drawing on analogies with earlier studies, especially those in agriculture. The Panel felt that it is time to put forth more systematic efforts toward developing principles for the design and analysis of studies within the special and possibly unique context of problems of education in general and the study of teaching in particular.

With respect to design and analysis, then, several major programs need implementation. One is the understanding and explication of methods of data reduction which yield (possibly) independent, minimal or reduced sets of descriptors of teaching processes and which adequately tag or reference the original observations.

A second is a better understanding of existing models and the creation of new models for identifying differential outcomes of teaching, possibly adjusted in one or more ways. This implies a concommitant need to search for and control some of the many variables that necessarily accompany the complex activity of teaching. Better ways are needed for (a) identifying confounding variables; (b) understanding how their influences operate; and (c) determining how those influences can be controlled.

A third is the problem of introducing explicitly into both design and analysis the use of prior and/or collateral information about the context and participants of a study which can, if successfully used, yield more efficiently designed studies.

A fourth is how to make research on teaching a cumulative enterprise. As Light and Smith (1971) have observed, "significant knowledge in the social sciences accrues ever too slowly. A major reason is that various research studies on a particular question tend to be of dissimilar designs, making their results difficult to compare. An even more important factor is that social science studies frequently produce conflicting results, which hinder theoretical developments and confuse those responsible for the implementation of social policies." At a minimum, what is needed are: (a) "criteria for determining when data from dissimilar studies can be pooled," and (b) "methods for recognizing fundamental differences in research designs, and avoiding the creation of artificial differences." (Light, R.J. and Smith, P.V. Accumulating evidence: Procedures for resolving contradictions among different research studies. Harvard Educational Review, 1971, 41, 429-471.

## Approach 9.2 - Increase Understanding of Existing Measurement Strategies for Research on Teaching and Where Appropriate Develop New Measurement Strategies

There is a long and productive history of psychometrics which has supplied theory and guided test construction for research on teaching. Much of this history, however, relates to concerns for measuring individual student aptitudes and achievement. Although this work has been and will continue to be of value to research on teaching, other aspects of measurement appear to need greater attention. For example, better measures of so-called non-cognitive outcomes of teaching, including personality characteristics, self-perception, values and attitudes, are required. There is a need for better theories about such constructs, but development of measures is also constrained by the need for better methodology. A second example is the need for better measures of the teaching process, particularly in natural settings. A third example is the need for group assessment measures as contrasted with measures designed to assess individual differences.

Current and pending legislation has given a sense of urgency to the solution of these problems. Thirty-one states are now considering laws requiring all applicants for a teaching license to demonstrate their teaching effectiveness. One example is the Stull Act, 1972, of California, which requires all school districts to evaluate their teachers. Many of these evaluations will be based on student outcomes, yet existing measures of student outcomes are largely restricted to cognitive achievement and aptitudes. Even these measures may not be appropriate since most were designed to distinguish among individuals (students) and not groups (classrooms).

Most of the programs identified under Approach 2 can be categorized as dealing with concerns for measuring the process of teaching or the outcomes of teaching. There are several motivations for measuring the process of teaching. For example, knowledge about what actually takes place in a learning situation is useful in stimulating new theories about teaching strategies. A second example is that much research is devoted to providing teachers with new strategies believed to facilitate student learning. If student outcomes do not reflect the attempts to change teaching strategies, then there are at least two explanations. One is that the strategies were not effective, and the second is that the strategies were not implemented by the teachers. Better measures of the teaching process are necessary to narrow the alternative explanations.

With respect to the measurement of outcomes, there is a need to develop or select measurements which are valid for assessing the effectiveness of an intervention. This need stems from the inappropriateness of many current and widely used measures, e.g., MAT, Iowa. These measures are inappropriate for assessing teacher (and curriculum) effects for a variety of reasons:

1. They were not designed to measure the outcomes of interventions.
2. They in practice deal with the measurement of relatively stable characteristics.
3. Functionally, the major purpose of these tests is the sorting and selection of individual students.

Recent efforts have been at least partially responsive to these measurement needs. First, numerous classroom observation instruments have been developed to measure the teaching process, and some useful data banks describing classroom activities are now available, e.g., the SRI Follow Through classroom observations. Nevertheless, the properties of existing observation schedules are generally not well understood, and problems of validity and realiability remain. Second, the recent surge in criterion-referenced measures should alleviate some of the concerns about existing achievement measures. Still, most of the work is concentrated on assessing individual student performance, while one of the major needs for research on teaching is to assess the impact of interventions.

There is an intimate relationship between this Approach and the Approach to develop and test new design and analysis strategies. Clearly, the reliability and validity of measures can limit the utility of a research study. Design and analysis strategies must be sensitive to the weaknesses of the measures, but cannot turn useless data into useful data. There is some reason to believe from recent literature that concerns for solutions to design and analysis problems have overshadowed concerns for solutions to problems of measurement. If so, this lack of balance should be corrected.

### Approach 9.3 - Identify, Demonstrate and Disseminate Methodologies from Other Research Disciplines Which Appear to Have Merit for Research on Teaching

The first two Approaches reflected a concern for the development of new design, analysis and measurement techniques which serve the unique needs of research on teaching. Most of the methodology currently used in research on teaching, however, was originally developed in other research disciplines. There are at least two reasons why continued identification, translation and dissemination of methodologies from other research disciplines seems warranted. First, in many cases, these borrowed methodologies have served the researchers of teaching quite well. Second, where existing useful methodologies are available, duplication of development should be avoided.

Because of the considerable interest in developing methodologies across a wide variety of research disciplines, staying abreast of methodological developments is no small task and would appear to require a major effort in its own right. At a minimum, the Approach calls for an awareness of methodological developments in econometrics, sociology, psychology, anthropology, as well as applied and mathematical statistics. These methodological developments need to be screened for their potential utility for research on teaching, and the more promising methodologies tried out in a demonstration mode. As a start, the Panel attempted to identify (in the form of programs) a few methodologies that at least on the surface appear to have utility for research on teaching. These include Organizational Development Methodologies (9.3.4), Computer Simulation (9.3.5), Path Analysis (9.3.6), and Scaling Methods from Consumer Research (9.3.7).

## Approach 9.4 - Consider the Utility of Standards for Improving Methodological Practice in Research on Teaching

Setting methodological standards has been a fairly common practice. The hope is that through the establishment of a set of minimal levels of acceptable quality, the consumer will be protected. Perhaps the most relevant example is the APA-AERA standards for test publishers. In addition, several other groups are also considering the possibility of standards for program evaluations. Two reasons were suggested for attempting to develop such standards for research on teaching. The first was that some research on teaching contains methodological flaws, many of which are common across time and across studies. The second reason was that much of the research done on teaching is not cumulative in nature. It is difficult, and sometimes impossible, for teachers and/or educational researchers to pool together results from studies dealing with common interest areas.

Nevertheless, the consensus of the Panel was that it is neither desirable nor possible to legislate (through standards) the methodological quality of research on teaching. Researchers must take a creative approach to data analysis and be willing to use multiple strategies in order to obtain full utility of their data. It seems likely that methodological standards for research on teaching would militate against such practices and, instead, promote rather routine and unthinking analyses. Further, research on teaching has special yet varying methodological needs which one set of standards could not begin to address. It was decided, therefore, to discourage the development of methodological standards. In place of standards the Panel recommended several programs to facilitate communication of information about how to handle methodological problems that are of major concern in research on teaching.

This Approach contains two main ideas: (a) establishment of archival data which can be used for secondary analysis and for illustration of the results of alternative design and analysis strategies; and (b) procedures for disseminating the results from the first three Approaches. The desired result is to encourage those doing research on teaching to use the "best known practices" in measurement, design, and data analysis.

## LIST OF APPROACHES, PROGRAMS AND PROJECTS

| | |
|---|---|
| 1. Develop and Test New Analysis and Design Strategies Appropriate for Research on Teaching | 9.1 |
| a. Analysis Problems Related to Hierarchically-Nested Data | 9.1.1 |
| i) Models for Estimating Relations Among Variables at a Lower Level of Aggregation | 9.1.1.1 |
| ii) Models for Data Aggregation | 9.1.1.2 |
| iii) Analysis of Unbalanced Designs | 9.1.1.3 |
| iv) Consequences of Violating the Assumption of Independence | 9.1.1.4 |
| v) Analysis of Non-Independent Student Data | 9.1.1.5 |
| b. The Utility of and Methods for Conducting "True Experiments" in Research on Teaching | 9.1.2 |
| i) Use of Incentives for Participation in "True Experiments" | 9.1.2.1 |
| ii) Ethical Issues of Conducting "True Experiments" | 9.1.2.2 |
| iii) "True Experiments" Within Quasi-Experiments | 9.1.2.3 |
| c. Data Analysis Procedures for Quasi- or Correlational Studies | 9.1.3 |
| i) Adjusting on Multiple Fallible Covariables | 9.1.3.1 |
| d. Development and Exploration of Formal Models for Incorporating Information About the Extent of Implementation of Teaching Strategies into the Evaluation of Those Strategies in Terms of Outcomes | 9.1.4 |

e. Investigation of the Utility of Longitudinal (time - series) Designs for Various Types of Research on Teaching and Concomitant Analytic Problems 9.1.5

f. Empirical Selection of Models of the Teacher/Student Interaction Process 9.1.6

g. Procedures for Combining the Results of Related Studies over Time 9.1.7

h. Procedures for Studies of Teacher Effectiveness 9.1.8

  i) Problems Due to Lack of Random Assignment 9.1.8.1

  ii) Following Students Over Time 9.1.8.2

  iii) Procedures for Combining Several Intraclass Correlations into a Single Estimate 9.1.8.3

i. A National Study of Current Educational Practice Analyzed at the Behavior Setting or Organization of Instruction Level 9.1.9

  i) Development of Behavior Setting Types 9.1.9.1

  ii) Economical Ways of Acquiring Information on Behavior Settings 9.1.9.2

  iii) National Survey of Classroom Behavior Settings 9.1.9.3

2. Increase Understanding of Existing Measurement Strategies for Research on Teaching, and Where Appropriate Develop New Measurement Strategies 9.2

a. Educational Significance of an Effect 9.2.1

  i) Indirect Validation 9.2.1.1

  ii) Direct Validation 9.2.1.2

b. Analysis of the Desirable Properties of Tests Stratefied by the Purposes of the Tests 9.2.2

c. Construction of Tests with Face Validity 9.2.3

  i) Development of New Measures which are Tied to the Purposes of Instruction 9.2.3.1

  ii) Development of Measures Dealing with Non-Cognitive Outcomes 9.2.3.2

  iii) Development of Measures for Observations of Student Process Variables 9.2.3.3.

d. Analysis of Crossed Design Achievement Tests 9.2.4

e. Test Bias 9.2.5

f. Evaluation of Profiles 9.2.6

g. Defining Desired Teacher Performance 9.2.7

h. Development of Measurement and Observational Procedures to Describe Degrees and Types of Implementation of the Components of Various Teaching Processes and/or Programs 9.2.8

  i) Measuring Implementation 9.2.8.1

  ii) Stability of Student and Teacher Behaviors 9.2.8.2

i. Studies to Improve the Reliability of Observational Procedures 9.2.9

3. Identify, Demonstrate and Disseminate Methodologies from Other Research Disciplines Which Appear to Have Merit for Research on Teaching 9.3

a. Optimal Designs for Research on Teaching 9.3.1

b. Problems in Developing Measurement Procedures to Describe Various Teaching Processes or Programs 9.3.2

c. Evolutionary Operation 9.3.3

d. Organizational Development Methodology for Use in Formative Research on Teaching Strategies 9.3.4

e. Computer Simulation 9.3.5

f. Path Analysis and Other Models for Estimating Causal Relationships 9.3.6

g. Scaling Methods from Consumer Research 9.3.7

h. Generalizing from Non-Random Samples 9.3.8

i. Investigation of Potential Uses of Exploratory Data Analysis Developed by John Tukey 9.3.9

  i) Stem-and-leaf plots 9.3.9.1

  ii) Robust/Resistant Regression 9.3.9.2

  iii) Jackknife Procedures 9.3.9.3

j. Analysis Model for the Estimation of Non-Additive Effects of Teaching in Other Than Factorial Designs 9.3.10

k. Development of Statistical Decision Theory Models for Monitoring the Instructional Process 9.3.11

  i) Monitoring Individualized Instruction Programs 9.3.11.1

  ii) Decision Theoretic Approach to Problems of Test Bias 9.3.11.2

| | |
|---|---|
| 4. Consider the Utility of Standards for Improving Methodological Practice in Research on Teaching | 9.4 |
| a. Secondary Analyses and Alternative Designs | 9.4.1 |
| b. Research Data Archive | 9.4.2 |
| c. Training Programs | 9.4.3 |
| d. Providing the Methodological Capacity to Support Research on Teaching | 9.4.4 |
| e. Test Evaluation Manuals | 9.4.5 |

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NATIONAL INSTITUTE OF EDUCATION
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# NIE CONFERENCE ON STUDIES IN TEACHING

## PANEL 10 SUMMARY

## THEORY DEVELOPMENT

### GOAL STATEMENT

To advance the development of theory that improves understanding, prediction, and control of phenomena in the teaching process and their antecedents and consequences.

### PARTICIPANTS

Dr. Richard Snow, Chairperson
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Dr. William R. Charlesworth
Mr. Miles Meyers
Dr. Jonas Soltis
Ms. Penelope Peterson, Secretary

# SUMMARY

The Panel on Theory Development concentrated on the ways and means of advancing theory development in general rather than on the substantive problems of theory development in any particular area of research on teaching. Attention was, therefore, focused on four independent mechanisms that seemed to be most potent in attacking the difficulties involved in theory development. The mechanisms became the Approaches under which the Programs were organized:

1. "Back-room Groups" -- working groups on comparative theory and methodology.
2. "Loners" -- individual programmatic theory development.
3. "Book of Examples" -- instruction in theory development.
4. "One-shot" projects on particular short-term needs.

## DISCUSSION

The history of western science shows that theory development is the best and most efficient means of advancing knowledge and control of natural phenomena. In education, however, and particularly in the study of teaching, research and practice often appear devoid of theory. At least, it is fair to say that the theories guiding research and practice here have remained largely implicit, unformalized, and unclear. Theoretical work has not yet become a major activity of educational researchers working on the study of teaching. This is perhaps understandable, given the relatively short time that systematic and programmatic research has been pursued and supported in the United States. However, through the second quarter of this Century, and particularly during the past two decades, diverse research efforts have produced scattered arrays of empirical findings. As research findings accumulate, there is an increasing need to organize what has been learned into theoretical form. And there is increasing need for this system to be guided by, and toward, theoretical issues. Theories are useful well beyond their role in structuring knowledge, or the pursuit of knowledge, for its own sake. They are not merely the esoteric playthings of academicians. They package accumulated knowledge for dissemination and application in further research and, perhaps more importantly, in practice. In education, theory may provide the best, most efficient means of translating research into practice. Teachers and teacher trainers do not apply research evidence directly; they apply theories that make research evidence understandable and usable. And theory can also be a medium of communication from teaching practice to research.

Thus, improved theories will help define, organize, and guide continuing research. They will provide vehicles to carry research to practice and practice to research, for the examination and improvement of each. And they will serve, as well, the systematic planning and funding efforts of NIE.

The goal to which this Panel is addressed is to:

> Advance the development of theory that improves understanding, prediction, and control of phenomena in the teaching process and their antecedents and consequences.

This is an awesome goal. While the Panel had no difficulty in adopting this statement of the ultimate goal, members did express doubt that a small panel in a four-day conference could make really significant headway on the broad front implied by the statement. Given these limits, it was agreed that the Panel should concentrate on the ways and means of advancing theory development in general, and in the abstract, rather than on the substantive problems of theory development in any particular area of research on teaching. Theoretical issues in any particular area of research on teaching would best be left to the consideration of the relevant substantive panels. The Panel also chose not to elaborate the case in favor of attention to theory, or the definition of what does and does not constitute a theory, as these issues have been well discussed in the literature. The Panel suggested several sources which argue in favor of and against emphasis on theory, and which discuss definitional issues.

The act of making theory is a creative human behavior and is influenced both by forces within the individual theorizer and in the social, cultural, economic, and political context within which the theorizer works. The act itself, and the processes that influence it, are themselves open to systematic philosophical and scientific analysis. Such analysis may be the best means of discovering and/or inventing the ways in which improved theory construction, and hence improved theories, can be obtained.

Scientific creativity has often been a topic of learned discussion. There have been armchair descriptions of steps involved in building and testing theories and in human problem-solving in general. And there has been psychological research on the correlates of creativity in theoretical work. But little is yet known about predicting or fostering creative theory development among researchers. On the assumption that those who themselves are distinguished for their scientific creativity know best how to advance it, a meeting of some of the world's most prominent scientists and philosophers of science was held recently in West Germany. (See Science, June 21, 1974, Vol. 184, p. 1273; full proceedings to appear in Excerpta Medica.) Selected quotations from the Science report on this meeting, by T. H. Maugh II, will help detail the problem area faced by this Panel, and connect it to the general problem faced by all who are charged with the goal of "advancing the development of theory."

> "More than 90 percent of scientific innovation, it is frequently argued, has been accomplished by fewer than 10 percent of all scientists. This situation presumably exists because only a few scientists have creativity--that ill-defined state of mind which allows the investigator to forge anomalous or apparently unrelated facts into bold new chains of theory. The pace of innovation could certainly be increased to meet pressing technological [and educational, and other social] problems if the number of creative scientists could be increased, but how to accomplish this feat remains a very difficult problem. Is it, in fact, possible to teach creativity? Is it possible even to create conditions that nurture preexisting creativity? Or is it possible only to expand the number of practicing scientists in the hope that the percentage of creative scientists will remain constant?

" . . . The conference . . . [was] less productive than its sponsors might have hoped. The assembled group was able to agree on many innate characteristics that contribute to creativity--characteristics that would be readily recognized by anyone familiar with the vast literature about creativity--but it did not reach any consensus about what might be done to enhance these characteristics.

"Perhaps the principal problem, as Leon Eisenberg pointed out . . . is that the scientist who attempts to explain in retrospect how he developed a creative idea is only rationalizing a series of events that he thinks might have happened. . . . Innovation is, for a majority of people, essentially a preverbal process; . . . translating that thought process into words almost certainly alters the perception of the process. Many conclusions drawn from this verbal reconstruction of the creative process may be incorrect if the reconstruction is itself faulty.

" . . . A major element in scientific success is the ability to distinguish between ideas and good ideas. Creativity, suggested Sir Karl Popper, can be divided into two stages--obtaining ideas and criticizing those ideas to determine which are worthless and which are worthwhile. . . . The ability to generate ideas is the innate part of creativity that probably cannot be altered, while the development of a critical faculty is the essential part of creativity that can be nurtured through education. Failure to develop this faculty, argued Gustav Born, is one of the major causes of scientific sterility. . . .

"And how is this creative facility developed? Generally, most of the participants agreed, through the master-apprentice relationship that arises from working with a successful scientist.

"But few young scientists are able to enjoy the luxury of working and associating with Nobel-quality scientists. What then can be done to help them develop this necessary critical faculty? Most of the conference participants argued . . . that 'creative science' could not be taught in universities. Many . . . spoke derisively of . . . teaching courses in creative writing, suggesting that it is not possible to teach creativity in any subject.

" . . . [But] most such courses are actually teaching criticism of creative writing. That is, the instructor . . . [assumes] that the students have some creative writing ability, then teaches them how to distinguish good writing from bad writing, how to avoid making certain types of mistakes in writing, and how to avoid the banal and the trivial. The analogy to creative science is straight forward and, though the application of the concepts may be somewhat more difficult than is the case with creative writing, the benefits that might be derived from this type of education in science could be far greater."

We draw from these remarks and from our own panel discussion at least four kinds of issues involved in the problem of advancing theory development.

1. Despite centuries of theory development in science, the process of theory construction and the means of promoting it are not well understood. There are relatively few creative theoreticians in established sciences, and fewer still in new areas of research such as education.

2. The impression is strong that theory development is at base the product of hard, solitary, cognitive work by individuals--not by groups, programs, systems, or other organized collectivities--and that individuals differ in innate creative potential for theoretical work. There is considerable doubt that theoretical productivity can be improved by education or training. Yet there is no solid evidence that it cannot be advanced by organized learning of some sort. Parts of the process appear to have been learned in the past by imitation in master-apprentice relationships. For example, it is felt that the development of a critical facility can be learned. Some ideas and analogies from other fields can serve as models for instructional attempts. And some other mechanisms for facilitating theoretical work seem promising enough to be well worthy of trial.

3. Advancing theory in education is an especially complex problem because of the complexity of educational phenomena. All that is known about human behavior is potentially relevant to behavior in the educational realm. And educational phenomena seem to have unique or emergent properties requiring a kind of theory not derivable directly from behavioral and social science.

4. Theories in education, and particularly theories of teaching, need ultimately to be both descriptive and prescriptive-normative in character. That is, theories in education need both to provide explanations of what happens in an educational setting, and to indicate improvements that should be pursued. While this distinction between functions of theory has long existed in established sciences and their applied fields, nowhere is the demand for close relationship between description and prescription greater than in education today. The coordination of these two functions and the normative or value considerations that condition their form is not well understood.

Early in the Panel's deliberations it became clear that a hierarchical description of this problem area was not the most productive way to proceed. Unlike the problem of specifying substantive research in a field, the problem of theory development seemed best attacked by elaborating the various difficulties, problems, and unanswered questions that inhibit theoretical advance, and then identifying or inventing ways and means of overcoming, or at least reducing, these impediments.

Using the hierarchical description of this problem area seemed to interfere with this process. Thus, the hierarchical structure was set aside in favor of a facet or matrix structure in which difficulties could be crossed with mechanisms for attacking them. Here, incidentally, is an example of another kind of difficulty inhibiting theory development; different structural models (or theories) can constrain or facilitate conceptual analysis of a particular problem. The contrast between hierarchical and facet structures shows them to possess different powers for different theoretical purposes.

To construct the matrix, eight difficulties that impede theory development were listed to form eight separate columns. These were stated in the form of questions. Then, four possible mechanisms were indentified that held some promise for reducing or eliminating at least one, and potentially several, of the difficulties. These formed the rows of the matrix. The eight difficulties were stated in the form of questions:

1. What theories or theoretical constructs exist for application in research on teaching, and how can these be identified and selected? It is clear that a wide variety of theories and constructs exists in social and behavioral science. There are concepts available from philosophical analyses of scientific research, or normative considerations in education, and of the act of teaching as well. There might also be useful constructs derivable by analogy from physical and natural science. These constructs can be grouped into major forms or types of theory, or subdivided to identify key variables and relationships. Until we have some conception of the catalog of possibilities, it will be difficult to judge which lines of theory development are likely to be most useful.

2. What constraints on new theory development are imposed by currently dominant paradigms? The Zeitgeist, or "temper of the times," the societal, philosophical, or cultural traditions, and the current fashions in research and statistical methodology, all constrain theory development. There is need for continuing consideration of these metatheoretical and methodological issues, and for critical evaluation of current programs of research, both to explicate the constraints and to identify areas of potential theory development that have previously been ignored.

3. How are theories constructed from research? from practice? from other sources? We know very little about the psychology of theory construction, or about the social, economic, and political forces that shape theory development. Without adequate understanding of these processes, we cannot hope to promote improved theory development effectively or efficiently.

4. How are good theories constructed? We need better understanding of the role of critical evaluation in theory development.

5. How are theories applied in research? in practice?

6. Are unique theories of teaching necessary? To what extent can theories of teaching be derived from other theories?

7. How can communality, translatability, and systematization of theoretical and technical language be achieved?

8. How can we keep people (from) rediscovering "wheels" and "spooks"? On the one hand, considerable theoretical resources are wasted in discovering and developing new ideas that are old, and in pursuing ideas that are illusory, i. e., that have been disproved or are unprovable. On the other hand, sound theory development requires that considerable effort be expended in replication and generalization. And old illusions sometimes become new facts as theory and methodology develop, and fashions change. Research on teaching needs to be made both cumulative and reflective.

Attention was then focused on four mechanisms which seemed most potent in attacking the largest number of difficulties. These mechanisms were adopted as approaches.

Approach 10.1 -- Working Groups on Comparative Analysis, Evaluation, and Integration of Theory Developments.

The basic objective of this Approach is to provide the field with an independent panel that has wide knowledge of theories, theory development, theory comparison, and methodology and can review and comment on and integrate the existing literature. This would be accomplished by forming one or more relatively permanent working groups of specialists in social-behavioral science, education and philosophy.

Approach 10.2 -- Individual Programmatic Theory Development

This Approach is premised on the observation that primary theory development in a substantive field requires long, hard work by a researcher working alone, without short-term constraints on schedule and productivity. Examples of great theory in the history of science show the crucial importance of solitary unconstrained intellectual work at significant points in the process. The Panel outlined four specific needs for program activities in this approach: research on a psychological theory of theory construction

(10.2.1); philosophical analysis of the extent to which unique theories of teaching, as opposed to theories borrowed from social-behavioral science, are required (10.2.2); theories of social, cultural, economic and political processes that promote on constrain theory development (10.2.3); and research on how theories are extended beyond the data they were designed to explain (10.2.4). The Panel also advocated a fifth program that would be begun later that would fund individual theorists for intensive theory development effort (10.2.5).

### Approach 10.3 -- Instruction in Theory Development

The basic purpose of this Approach is to provide a better understanding for the prospective theorizer, either researcher or practitioner, of examples of theory development processes and the choices and difficulties faced therein. While it may be premature to consider broad approaches aimed at instructing researchers and teachers in theory development, it could be extremely useful to have examples--case studies of theory development in process and perhaps also of theory in application.

### Approach 10.4 -- One-Shot Studies on Delimited Needs

There are several specific needs, both for promoting progress across other approach categories and for dealing with other isolated but critical issues. These seemed best addressed by delimited one-shot projects.

Specific purposes of these study projects are as follows:

- Provide for identification of implicit and explicit theory used by teachers in practice including analysis of common sense constructs. (10.41)

- Develop a matrix of existing behavioral and social science theories and constructs, crossed with teaching roles and problems, crossed with methodologies appropriate for study of theory-problem intersections. (10.42)

- Provide for analyses of communality and translatability of theoretical and technical language. (10.43)

- Provide for studies to determine the value implications of theoretical constructs, and the values of researchers that lead to these theories. (10.44)

The 4 x 8 matrix formed by crossing difficulties in theory development and mechanism (approaches) is shown in Exhibit I, with the four adopted approaches as rows. Within each approach, one or more Programs are defined. The identifying number for each Program appears in only one row (Approach) but in all columns (difficulties) on which it bears. An asterisk denotes the cell to which each program is primarily addressed.

## EXHIBIT I

## DIFFICULTIES IN THEORY DEVELOPMENT AND MECHANISMS TO ATTACK THEM

| Difficulties in Theory Development / Mechanisms - Approaches | What theories and constructs exist? How select for study? | What constraints on theory development imposed by current paradigms? | How are theories developed from research? practice? other? | How are good theories constructed? | How are theories applied in research? in practice? | Are unique theories of teaching necessary? | How to systematize theoretical and technical language? | How to keep people (from) rediscovering "wheels" and "spooks" |
|---|---|---|---|---|---|---|---|---|
| Working groups on comparative theory and methodology 10.1 | | 10.11* | | 10.11 | 10.11 | | 10.11 | 10.11 |
| Individual programmatic theory development 10.2 | | 10.21<br>10.22 | 10.21*<br>10.22<br>10.23<br>10.24<br>10.25 | 10.23<br>10.25 | 10.25 | 10.23*<br>10.24 | | 10.21<br>10.22 |
| Instruction in theory development 10.3 | | | 10.31*<br>10.32 | | 10.31<br>10.32* | | | |
| One-shot projects on particular short-term needs 10.4 | 10.41<br>10.42*<br>10.43<br>10.44 | | 10.41<br>10.43 | | 10.41*<br>10.43* | | 10.45* | 10.45 |

## LIST OF APPROACHES AND PROGRAMS

1. Working Groups on Comparative Analysis, Evaluation, and Integration of Theory Developments. 10.1
    - a. Comparative and Integrative Theory Evaluation and Development 10.1.1
2. Individual Programmatic Theory Development 10.2
    - a. Psychological Process of Theory Construction Related to Research on Teaching 10.2.1
    - b. Social, Cultural, Economic, and Political Processes Influencing Theory Production and Application in Research on Teaching 10.2.2
    - c. Philosophical Analysis of Need for Unique Theories of Teaching 10.2.3
    - d. Theory Extension and Utility Testing 10.2.4
    - e. General Project Description for Individual Research Awards in Particular Intersections of Theory and Practice 10.2.5
3. Instruction in Theory Development 10.3
    - a. Development of a Manual of Theories and Theorizing for Researchers 10.3.1
    - b. Development of a Manual of Theories and Theorizing for Teachers 10.3.2
4. One-Shot Studies on Delimited Needs 10.4
    - a. Identifying Implicit Theories of Teachers 10.4.1
    - b. Development of a Matrix Representing Basic Constructs from Behavioral and Social Theories, the Methods by Which They are Operationalized, and Their Applicability to Teaching Functions. 10.4.2
    - c. Collation and Analysis of Theories used in Studies of Teaching 10.4.3
    - d. Identifying the Values Implicit in the Practices of Researchers on Teachers 10.4.4
    - e. Conceptual (Philosophical) Analysis of the Language of a Given System for Studying Teaching 10.4.5

GPO 888-084

# NATIONAL PLANNING CONFERENCE ON STUDIES IN TEACHING

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